

In This Together: Developing Social Emotional Skills Through Collaborative Project-Based Learning

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Abstract: Due to the coronavirus pandemic and school closures, students have fallen behind in every aspect of education, including social and emotional development. One way to link academic development and social emotional development is through collaboration in the classroom. This research uses collaborative project-based learning to find impacts on the development of social emotional skills of a 3rd grade class at a rural elementary school. Some significant impacts were found relating to interest in school and perceived behavior and observed relationship skills. Students' behavior and interest were both positively impacted by this small scale research. Not all positive change was shown through statistically significant data. This research is a good baseline study for future research relating to social- emotional delays and development

Introduction and Justification

Social-emotional development refers to abilities which people gain in early childhood to feel and regulate a full range of emotions and to develop interpersonal relationships with other children and adults (Cohen, 2005). This development occurs through social-emotional learning (SEL) which is learned both through natural interactions but also taught in K-12 schooling (Borba, 2016). The five major pieces of social-emotional development include self-awareness, relationship skills, self-management, responsible decision-making and social awareness (Durlak et al., 2011). Having each aspect developed means children are able to handle their emotions and make connections and work with others respectfully and responsibly.

Many students are facing delays in their overall development due to the COVID-19 pandemic (Engzall et al., 2021). Academic delays are widely discussed, however, social and emotional delays are extremely common as well and just as detrimental (Egan et al., 2021) but are not as widely talked about. Academic and social-emotional delays are linked (Durlak, 2011) since working with others is important for academic success (Borba, 2016). Borba (2016) shows how social-emotional learning can be developed through an academic lesson. Social-emotional learning can be its own lesson, incorporated into the existing curriculum, or be developed through culture.

Collaborative learning has shown increases in multiple aspects of social emotional development, including kindness and collaboration (Laal, 2013). The use of collaborative

learning through a group project can increase the development of social skills in students. Students have shown increased communication skills (Tolmie, et al., 2010) and problem solving abilities (Song, 2018). The effects of collaborative learning go beyond the social emotional aspect but translate into academic understanding of the material (Baines et al., 2007). Overall collaborative project based learning improves the social skills as well as the academic performance of students in an elementary school setting.

Through my time as a student teacher I have seen the social delays and lack of emotional maturity in a third grade setting. This class does not have the language or mindset to control their emotions in a way that my mentor teacher has seen students achieve in the past. There have been many student behaviors which have required correction or In-School Intervention Center (ISIC) referrals that show this lack of maturity we are seeing. These include acts of physical violence as well as rude words and name calling. This research aims to improve social emotional development with the use of collaborative problem based learning. I measured all five aspects of social-emotional development, focusing on their self-management skills within their group. Therefore my research questions are: How can a collaborative project based learning approach increase problem solving and responsible decision making within a group? How will this affect students' self-management skills and their relationship skills? How does this intervention impact student interest in school and science?

Literature Review

Social Emotional Development

Cohen et al. (2005) define social-emotional development (SED) as the abilities which people gain in early childhood to feel and regulate a full range of emotions and to develop interpersonal relationships with other children and adults. Social emotional development can be measured in part by looking at levels of empathy (Borba, 2016) or kindness (Malti et. al, 2021). The development of these skills allows children to be active students, friends and later coworkers (Cohen et. al, 2005). Prior to entering school, children are developing these skills from their parents. Once children are in school, teachers and peers also have a major influence on SED (Cohen et. al, 2005; Durlak et. al, 2011).

Often the social-emotional aspect of development is overlooked but research shows that this aspect of growth is important for children (Durlak et. al, 2011). Borba (2016) writes about how through developing empathy, children grow into socially aware and kind adults who still get ahead but without pushing others down. Social emotional curriculum allows the growth of peer relationships (An et. al, 2021). These skills lead to better mental health outcomes later in life (Cohen et. al, 2005) and decreased anxiety (An et. al, 2021).

Teaching students how to navigate social-emotional complexities can maintain and improve academic ability throughout the students K-12 experience (Durlak et. al, 2011). The research looks at if SEL implementations improve student engagement, motivation and performance (Durlak et. al, 2011). Multiple studies have shown that social emotional learning has a positive impact on students and curriculum should be implemented. According to the analyses done, specific programming depending on school or local need can be incredibly beneficial to students and teachers (Durlak et. al, 2011; An, et. al, 2021).

COVID-19 Pandemic Impact of Social Emotional Development

Social emotional impacts due to the COVID-19 pandemic are not discussed as commonly as the academic impact facing students but they are also extremely common and detrimental (Egan et. al, 2021). All students faced some form of learning loss, even those who only experienced an eight-week school closure (Engzell et. al, 2021). Not all parents have the ability to meet all of their children's needs, including their education, while completing their normal tasks (Vogelbacher et. al, 2022). Students of a lower socioeconomic status have been hurt the most by closures. Learning loss was over 60% higher in disadvantaged homes over those who were in advantaged homes (Engzell et. al, 2021).

Social emotional development often occurs in young grades through playing and interacting with other students but many students did not receive that for over a year due to COVID-19 (Egan et. al, 2021). Parents were required to care for their children and educate their children while in a global pandemic which caused parents to face a lot of stress. The stresses experienced by parents or guardians, along with the other stressors of a global shutdown, will delay the learning and social development of young children (Vogelbacher et. al, 2022). Along with stress factors, children became shy and attached to their parents after the closure of schools. These impacts have also been presented through negative mental health impacts in some children. (Egan et. al, 2021).

Project Based Learning

Blumenfeld et. al (1991) defines project-based learning (PBL) as the process of learning through investigating and solving real world problems. Students are given the opportunity to explore an idea or concept in their own way to develop their knowledge of the topic and create a product that shows their understanding (Blumenfeld et. al, 1991). This gives students independence in their learning process. Students, given more freedom through productive failure, often master the concepts they are learning more fully (Song, 2018).

Students were able to increase their communication skills, discipline, responsibility, creativity and collaboration skills through PBL (Hartati et al., 2022). Students' motivation and academic performance significantly improved when participating in project-based learning (Blumenfeld et al., 1991; Hung et al., 2012). Students have a greater understanding of concepts learned when learned through PBL (Hung et al., 2012; Sukmawati et al., 2020).

Experiments relating to project-based learning have mostly occurred in upper grades, specifically college aged learners (Hung et al., 2012; Sukmawati et al., 2020; Song, 2018; Hartati et al., 2022), but newer research shows that students as young as kindergarten may be able to participate in PBL (Ferrero et al., 2021). Independence and self-regulation were both positive outcomes of project based learning, though teachers should have a larger role in the regulation of student behavior in younger grades (Ferrero et al., 2021). Peer interaction and collaboration were also positively impacted by project based learning (Sukmawati et al., 2020; Hartati et al., 2022)

Collaborative Learning

Collaborative learning refers to the process of multiple students working together for a common goal (Kapp, 2009). When students are able to effectively work together Kapp

(2009) found that using teamwork interventions can allow students to work together and reach their goals. Research about collaborative learning has shown improvement in both peer interaction (Tolmie et al., 2010) and academic performance (Baines et al., 2007). Students had a larger group of peers they enjoyed spending time with during their free time, due to the collaborative aspect of the work (Tolmie et al., 2010). Students independence and interdependence both improved using collaborative learning styles (Baines et al., 2007).

SED & PBL

Research has shown that there is a positive correlation between project-based learning and social-emotional development (Almulla, 2020; Llorent et al., 2022). In collaborative learning with others, students are reliant on one another and themselves to get the work done, meaning students learn to be responsible for their own learning as well as keeping their peers working towards their goals (Laal, 2013). This technique also pushes students to be more independent, imaginative and cooperative with peers (Bell, 2010).

Malti et al. (2021) found that between ages four and eight social-emotional development is occurring. The students being studied in my research were around age five when the COVID-19 pandemic started and are currently around age eight and nine. This could be a factor in the developmental delays being seen by teachers and staff. Project based learning could help guide students who have delayed social emotional development as it has been shown to do in previous research.

Methods

Participants

This study took place in a rural 3rd grade elementary school classroom in Southern Maryland. There are 20 students, 13 are girls and 7 are boys, who are participating in the study. Four of the students are Black, one student is Hispanic, and the remaining 15 students are White. This class of students is performing below grade level as a whole, with over half of the class requiring some kind of intervention, specifically in ELA. Five of the students have an IEP, three of which receive intensive interventions in reading, writing and math. Three students, one who has an IEP, also receive speech and language services multiple times a week. No students participating in this research receive gifted and talented services at this time.

Intervention

Students participated in a project throughout a four week period of their five week science unit about ecosystems and fossils. Prior to the unit starting, students completed a ten- question survey relating to science, school, and behavior (Appendix II). The first day was an introduction to ecosystems, including a class Know, Wonder, Learn chart and introductory details about each ecosystem. This gave students a similar base level knowledge to create a more evenly knowledgeable class on the subject.

Five groups of four will be created randomly in which students will work together to make a presentation about a specific ecosystem and ways their system would change based on what they know. Each group will be able to choose between forests, deserts, rain forests, grasslands, the tundra, mountains or oceans/wetlands. Within their groups, students

researched consumer, producer, decomposers, abiotic factors, and weather using their Ecosystem Research Notes graphic organizer (Appendix II).

Once groups are made and ecosystems are chosen, students will be given access to certain books within the class library, school library, and PebbleGo. Students needed day by day instruction on each question of the Ecosystem Research Notes. Each day one to two questions were explained. Some days started as independent work but turned into group discussions, some days were only independent work and some were all group work; this was dependent on the needs of groups. After individual research was complete on each section, groups met back together to discuss their findings. Once groups were done filling out the Ecosystem Research Notes (Appendix II), materials for students to create posters were given to groups. After two days of group work putting their presentation together, students will present their ecosystem to the class.

Data Collection

Observations.

Students were observed daily during interventions based on a behavior checklist (Appendix 4). Their science teacher and I each filled out a daily checklist while walking around during their science period. We then worked together to complete a single checklist for every student each day and added notes in as needed.

In-School Intervention Center (ISIC) Referral Statistics.

Many students have also received ISIC and office referrals during the year. The school counselor assisted by noting the amount of referrals for the three weeks prior to the intervention, the three weeks of the intervention and the three weeks post intervention. A drop in referrals would show less negative behaviors between peers.

Surveys.

Students completed a survey prior to the intervention and again after the intervention had been implemented. Both surveys will start out identical asking:

1. How do you feel about science?
2. How do you feel about your teachers?
3. How do you feel about your peers?
4. How do you feel about writing scientific information?
5. How do you feel about reading books about science?
6. How do you feel about working in a group?
7. How do you feel about working alone?
8. How do you feel about your behavior in class?
9. How do you feel about your behavior as a friend?
10. How do you feel about your listening skills?

The following emojis will be the response options to circle for the students.



This is the survey that shows information about emotional development as well as student interest in school and science.

After the project, students also answered questions about how their group and individual members specifically did. This was completed independently, and groups were separated so they did not see each other's responses.

1. Did all members of our group contribute to the activity?
2. Did all members of our group listen carefully to the ideas of other group members?
3. Did all members of our group encourage other members to contribute their thoughts and ideas?
4. One problem we had as a group was ...
5. The problem was solved by ...

This survey's goal was to see if students felt their group was able to work well together and solve problems if they did argue.

Table 1:

Research Questions and Data Sources

	Data Source 1	Data Source 2
How can a collaborative project based learning approach affect self-management skills?	Survey - Three questions about how students feel about their behavior, taken from the ten question survey.	Reports - ISIC referral count for three, three week periods (before, during, after).
How can a collaborative project based learning approach impact their peer relationship skills?	Observation - Daily observation checklist completed by their science teacher and myself	Survey - Two questions about how they performed and how others performed
How does this impact their interest level in school and science?	Survey - Three questions from the ten question survey	

Data Analysis

Student responses to a pre-intervention and post-intervention survey were collected then analyzed using paired two sample t-tests. There were then three t-tests run, one related to each of the survey questions based on a total of 10 survey questions.

Behavioral observations were collected each day using both qualitative and quantitative responses. Students were scored on a scale of 1-4 with 1 meaning they were consistently not showing positive behaviors and 4 showing they went above and beyond to show positive behaviors with no reminders. These scores were analyzed between Day 1 and Day 7 which were the seven days of this intervention where students spent the majority of their time working in their small groups without much teacher instruction.

Analysis of ISIC referrals for three times periods, prior to, during and after intervention, was conducted. Students who are showing repetitive off-task or negative behaviors receive an ISIC referral from a staff member. Higher numbers of referrals show a lower level of self-regulation and responsible decision making skills.

Validity Concerns

Throughout this process, especially when taking notes and analyzing teacher responses, biases need to be kept in mind for validity. To minimize bias, a checklist will be filled out on a scale of 1-5 and specific behavior will be listed to explain why a score is given. Students also have biases so to ensure that minimal changes are made between the two surveys, students will take the surveys in the same room at the same time of day with the same teachers present.

Results

How can a collaborative project based learning approach affect self-management skills?

Students felt that their behavior changed positively over the course of this intervention. According to student surveys p value ($.006 < .05$), statistically significant change occurred over the course of the project the students completed (table 2).

Table 2:

T-test comparing students self identified behavior

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>p</i>	<i>d</i>
Pretest	20	3.95	1.55	0.006	0.5
Posttest	20	4.45	0.68		

The results of this data shows that students felt their self-management and responsible decision making skills improve over this three-week period. These findings are statistically significant ($p < 0.05$) to a moderate effect size ($d < 0.5$) showing that this intervention did have an impact on the class as a whole.

Observational data showed daily increases in the improvement in students ability to make responsible decisions during science class. These improvements were not major but

were noticeable in their data and in the classroom. On day one, students struggled to make good choices, specifically with “maintaining a safe body and appropriate voice-level” ($M_1 = 2.61$) to the final day where students on average had zero reminders to stay on task ($M = 2.97$). In the last days of the intervention my mentor teacher and I both noticed students were more responsible within their groups.

Referrals written by teachers during this time period decreased for the class who experienced this intervention. In School Intervention Center (ISIC) referrals decreased for the three weeks of this intervention. For the three weeks prior to the collaborative project, 14 ISIC referrals were written for this class. There were only 6 written the weeks that the students were experiencing the intervention, none of which included hands-on (physical contact between two students) referrals. In the three weeks following the intervention 10 referrals were written for this class. Though longer lasting impacts were not shown in this data, results do show that during the intervention, students were more able to regulate themselves more.

How can a collaborative project based learning approach impact their peer relationship skills?

Analyzing student surveys, students did not express a significant positive change in peer to peer interactions over the course of the intervention. The change between the pre-survey ($M = 3.92$) and the post-test ($M = 4.12$) did show a positive change, however this change was not statistically significant.

Table 3:

T-test comparing teacher observed peer interactions

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>p</i>	<i>d</i>
Day 1	20	2.66	0.34	<0.001	1.71
Day 7	20	3.09	0.10		

Patterns in the data reflect a large effect ($d < .8$) and statistical significance ($p > 0.05$) in the observational data between Day 1 and Day 7 (first and final day with minimal teacher instruction). Though this change was significant, it was not noticed as much according to the notes taken each day about student behavior.

How does this impact their interest level in school and science?

Students came into this science unit not feeling overly positively about science but still had some enjoyment for it. By the end of the unit, students were asking why we can't do that unit all year. There was a statistically significant improvement in enjoyment of science (table 4) shown between the two surveys.

Table 4:

T-test comparing students interest in science

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>p</i>	<i>d</i>
Pretest	20	3.59	1.79	<0.001	0.61
Posttest	20	4.20	1.30		

These results show that students enjoyed participating in science or specifically this unit. A majority of the students responded higher to questions 4 and 5 (Appendix 3) which ask about how students feel about reading and writing in science in the second survey. Students showed active interest in science during and after the completion of this project.

Discussion

Overall, I found that students did enjoy and benefit from this intervention which shows similar results to previous research (Almulla, 2020; Laal, 2013). Peer interaction and relationships was a major focus of this research and students did not notice a positive change in this aspect, though teachers did note this as a positive change. Other implications were shown by the students, such as students' ability to regulate themselves, including respect, responsibility and readiness to learn.

Conclusions and Implications

Coronavirus school closures and limited peer to peer interaction have caused social delays in students. These delays have been seen across the country and specifically in my classroom (Egan et. al, 2021). Schools and teachers have been trying to intervene to stop or slow these delays as students are back to attending school, in-person.

I was able to see students slowly improve their communication skills over the course of this project. Throughout the school year, negative behaviors such as grabbing items out of other students' hands or talking over peers was a common occurrence. During the project, students shared with one another and communicated what each persons' role would be in each section. This intervention did not fix all of the negative behaviors in the class, however major steps were taken in the terms of social development.

This project pushed students to work together in a meaningful and productive way, which resulted in visible development in social skills towards one another. Students were able to communicate needs or problems to peers and their teachers in a respectful manner over the course of this project. That is shown in the statistically significant data found as well and classroom observations.

Limitations

There were only 20 students who participated in this research, which is a small sample size for research like this to be conclusive. This intervention worked on a small scale but because of the size, the results are not universal. This research was also only conducted over a three week period which is not enough time for major changes and long term implications to be shown.

Over the course of the project, students were pulled out of the room by other teachers for band and for intervention. This led to some groups working more efficiently than others.

Implications

Research working to decrease the social gaps seen in the last few years needs to continue, collaboration and/or project based learning is a good place for this research to begin. Before overarching implications can be made, larger scale and longer lasting research needs to be implemented.

Between the statistical significance I found and the qualitative notes and anecdotes, I plan to use collaborative project-based learning in my classroom in the future. This is a strategy that can and should be used even when not with the goal of intervening in social delays. With further developments in this research, teachers should use PBL in their classrooms to increase achievement (Blumenfeld et al., 1991; Hung et al., 2012), SED and enjoyment.

My intervention had some statistically significant success in statistically improving the negative social-emotional impacts left by COVID-19 school closures. This research shows that students were able to make better choices over the course of this research but this was not sustained after the intervention concluded. Students also showed a statistically significant greater enjoyment of science over the course of this research period. Where my research did not find statistically significant data, is in the peer relationships between the beginning and end of the time period. This project was conducted over a short window of time which did not allow for major development in these skills. With that being said, some improvements were shown but not a statistically significant amount. With the limitations, important data was found about whether collaborative project-based learning has a major impact on the social delays created over the course of COVID-19 pandemic, though not enough to make clear and major conclusions.

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Appendix I- Group Project Outline

	Monday	Tuesday	Wednesday	Thursday	Friday
1/2-1/6	No school	- Conduct Pre Intervention Survey - KWL chart as a class about ecosystems - Assign groups & choose ecosystem	- Introduce research and PebbleGo (log students in) - Model researching and filling out the Notes Packet - Write and draw a description of their ecosystem (pg 1 of notes packet)	- Whole group discussion about what sharing ideas in a group looks like - Independently finish pg 1 of the packet then discuss and share notes as a group	- Outdoor lesson about the parts of the ecosystem outside the school (abiotic, plants, animals, etc.) - Define the consumers, producers, decomposer and abiotic things
1/9-1/13	- Review parts of an ecosystem - Teacher models finding examples using an online resource - Students complete the parts of an ecosystem section in their packet	- Whole group discussion of how parts of an ecosystem interact - Students work in small groups to fill out how the parts of their ecosystem interact	- Each group gets an example of climate change in their ecosystem (e.g. no rain in the rainforest) - Students discuss in their groups what they think would happen if their card came true	- Whole group discussion about matching animals to their ecosystems - Students work in their small groups choosing one animal we discussed to explain why they animal lives in that ecosystem	- Students independently write about one animal that cannot live in their ecosystem and why - If students finish early they go back to finish anything incomplete - In small groups, write a list of materials to make their poster of their ecosystem
1/16-1/20	No school	- Students complete the last section of the packet in small group (filling in the blank with one animal chosen by the group) - Review the packet as a group when done	- Each group starts their poster - Students can design their ecosystem or start with the written description	- Groups continue to work on posters (add descriptions if they have not added any yet)	- Groups continue to work on posters (students complete checklist to make sure they have each required section)
1/23-1/27	- Students finish up their posters with final details - Group 1 will present their posters (other students are given the opportunity to ask questions)	- Two more groups present their poster (other students are given the opportunity to ask questions)	- Final two groups present their poster (other students are given the opportunity to ask questions)	- Students fill out the post intervention surveys - Wrap-up and review the unit by completing the KWL chart	No school

Appendix II- Ecosystem Research Notes

Name_____

Ecosystem: _____

What is the weather like in this ecosystem?

Draw what your ecosystem looks like:

Where in the world is your ecosystem found?

Give examples from your ecosystem:

Consumers (animals):	Producers(plants):
Decomposers:	Abiotic (non-living):

How do the parts of your ecosystem interact?
What do you think would happen if _____?

Choose one animal from your ecosystem. What is one trait that allows them to live in the ecosystem?

What is one animal that would not survive in your ecosystem? Why?

What do you think would change about a _____ if they were put in your ecosystem?

Appendix III- Survey Questions

Name: _____

Respond to the following questions by circling or highlighting an emoji.

1. How do you feel about science?



2. How do you feel about your teachers?



3. How do you feel about your peers?



4. How do you feel about writing scientific information?



5. How do you feel about reading books about science?



6. How do you feel about working in a group?



7. How do you feel about working alone?



8. How do you feel about your behavior in class?



9. How do you feel about your behavior as a friend?



10. How do you feel about your listening skills?



Appendix IV- Behavior Checklist

Student Number	Using provided resources appropriately	Consistently On-Task	Maintains a safe body and appropriate voice level	Sharing ideas with their group	Listening to other group members	Disruptive to others	Being disrespectful or unkind to peers
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							

Dear Dr. Jang,

Thank you for the suggestions on my paper throughout the course of writing this paper. Below are the changes that I made to the paper based on your suggestions.

Respectfully,

Kendrick Horan

Section	Suggested Changes	Implemented Changes
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Introduction and Justification		
Literature Review		
Methods	- How were biases kept in check?	- Added “To minimize bias, a checklist will be filled out on a scale of 1-5 and specific behavior will be listed to explain why a score is given.”
Results	- Cite previous research - Add a paragraph about personal observation	- Added “(Almulla, 2020; Laal, 2013).” - A paragraph was added about the positives seen within the classroom.
Conclusions and Implications	- Add implications for other educators - Why do I believe no statistically significant data was found between “the peer relationships between the beginning and end of the time period.”?	- Added “With further developments in this research, teachers should use PBL in their classrooms to increase achievement (Blumenfeld et al., 1991; Hung et al., 2012), SED and enjoyment. - Added “This project was conducted over a short window of time which did not allow for major development in these skills. With that being said, some improvements were shown but not a statistically significant amount.

