The Impact of Collaborative Learning through Survivor Algebra in the Mathematics Classroom

A Capstone Project
Submitted in Partial Fulfillment
of the Requirements for the Degree
of Master of Arts in Teaching: Mathematics

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Chapter One

Introduction

The Internet can be a powerful tool for educators. I am constantly searching for new and exciting material to use in my classroom. It is difficult to think of teaching without the Internet as a resource. As the sole mathematics teacher in a small school located in a rural Midwest town, I am especially appreciative. The Internet replaces the math colleague I do not have immediately available to me. I am able to use it to extract countless excellent ideas from math teachers and other educators across the web. During one of my searches, I came across a program created by Karen Lyn Davis called Survivor Algebra. I found it to be a new and interesting way to incorporate collaborative learning into my classroom.

Motivation for the Project

I am currently in my sixth year as a math teacher. If there is anything that I have learned throughout the years, it is that I can always improve my teaching methods. Group work has been an area for me that I have wanted to make more of a regular practice in my classroom. I usually put students into groups for projects or activities, but this is far from a daily or even weekly occurrence. I want collaboration amongst my students to be more consistent and structured.
Background on the Problem

There are days when I reflect on how the school day went, and I notice several aspects that I would like to improve. Many times I see students bored, making no attempt to get involved. This carries over to them being unable to grasp the material and performing poorly on tests. Then there are other days when I think my lessons went well, and I noticed a common thread between these lessons seemed to be student participation. These moments of success almost always included some group work activities. Students appeared more comfortable participating in smaller groups than in class discussion. Many times I assign each student a specific job in the group, forcing each one to get involved. These jobs range from note-taking to speaking. These observations further show me how important it is to get my students to actively participate in the classroom through group work.

Statement of the Problem

Let me go back to my years as a student in high school and college. When I look back at the classes in which I learned the most and the ones I truly enjoyed, these were the classes that had regular group work and student involvement. I rarely look back with fond memories of my classes where the instructor stood up in front of the room and lectured the entire time. I want to become the teacher that my students look back upon with positive feelings. I want them to see I made an
effort to get them motivated to learn. I want to focus on using a collaborative learning approach to improve the effectiveness of my teaching.

**Statement of Purpose**

I plan to use ideas from the Survivor Algebra program to create my classroom project. I am going to use regular group work, friendly competition, and rewards all based on a popular television program. If used correctly, I believe the cooperative learning through Survivor Algebra will be very effective in the learning process of my students. The goals I am setting for my students come directly from the *Survivor Algebra User’s Manual* and include the following:

- To build critical thinking skills
- To get involved in their own learning
- To reduce the anxiety of being in a math class and ease nerves during exams
- To strengthen their ability to learn math (and other things) on their own
- It will build the student’s confidence with math and other seemingly difficult subjects
- To increase exam performance and retention of material learned
- To provide students with a deeper understanding of the material
- To help students get to know their fellow students and teacher better

(Davis, 2007, p. 2).
Research Questions/Hypotheses

The main question for my research project is this: Will my students’ test scores and daily work improve, and do they think using my version of Survivor Algebra was a success? I will evaluate this by comparing my students’ grades while using Survivor Algebra with their grades before using the program. I am also going to write a journal that will detail my daily observations of student behaviors and attitudes as well as my thoughts about implementation of Survivor Algebra and its successes and challenges. A pre and post survey will be given to acquire opinions regarding collaborative learning and Survivor Algebra.

Summary

Through the use of Survivor Algebra and collaborative learning, I want my students to become motivated to do well, to fully understand the material I am teaching, to get involved, to improve their test performance, and to have fun in the process. This would make the overall project a success. In the following chapter, I discussed the literature I found regarding Survivor Algebra and collaborative learning.
Chapter Two

Review of Literature

Success is sometimes dependent on learning how to function in groups. Foster and Theesfeld (1993) highlighted the importance of learning how to collaborate with others:

The success and progress of our society is dependent on cooperation among humans. Cooperation is very important in the daily operation of business and business organizations. Our government must cooperate with other nations. Members of sports teams must cooperate in order to be successful. Families must function in a cooperative manner in their relationships to each other. (p. 1)

They also explained that individuals need to learn certain skills to be successful in collaboration, and that these abilities could be developed in the classroom. The National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics (Standards) and the Teaching Standards supported this research. According to Foster and Theesfeld (1993), the Standards expressed how:

1. Cooperative group activities should replace the traditional lecture methods as much as possible in the day-to-day mathematics classroom activities.
2. Teachers should provide opportunities for students to work together in problem-solving situations. This allows students to discuss strategies for solutions, relate a problem to others like it that they may have solved, and resolve their differences. Students may acquire ideas from others that will lead to a solution of a problem that they could not solve by working as individuals. It is most important that students share ideas and work together toward a common goal.

3. Each member of the team plays an important part in the solution of a problem. Students must learn that the success of the team is as important as the success of each individual. The problem being solved is a group problem, and all members will share the success or failure of the team. To accomplish this goal, all students must talk with one another and discuss the problem being solved. It must be clear to all team members that the work of each individual has a direct effect on the success of the team. All students must be willing to accept responsibility for their learning. (, p. 1)

Survivor Algebra will be used to teach my students these life skills along with achieving the goals listed in Chapter 1. Davis (2008) cited several problems that led her to create this program. She stated that students were bored. They hated math, lacked motivation, and were not learning the material. She alluded to
what happened when she switched to using Survivor Algebra as a form of collaborative learning:

I really view myself more as a motivational speaker now, than as a math teacher. I used to have a very typical success rate for a community college math teacher – a very sad 40%. Yes, that’s typical…and it’s also completely unacceptable! Since I made these changes, I’ve enjoyed a very steady 75-80% success rate…for years! My students have worked very hard to earn that success…I’ve just encouraged them to do so. (p. 16)

Davis outlined her typical first day school before making the change to Survivor Algebra.

I’d always go through my class syllabus (which is just a bunch of rules about homework and absences) – blah blah blah…And, then, I’d give a 30 minute dissertation on the perils of cheating. In short, I was starting the semester by talking about a bunch of negative things. Start out negative…and stay negative. (p. 16)

She realized a change was in order. She replaced her typical first day of school with a positive approach that involved giving a speech on success. In the following sections, I will discuss the definition and goals of collaborative learning and the role of the teacher and students.

Collaborative Learning
Collaborative and cooperative learning are the primary foci of the following studies. According to Ares (2008), collaboration is group work in which individuals work as a whole to complete a task, and cooperation is a specific type of collaboration in which the task of the group is divided up into subtasks for group members to complete. With collaborative learning, group success is determined by accomplishments as a unit. A group’s success in cooperative learning is “dependent on, and being a direct effect of, the individual work of each member of the team” (Foster & Theesfeld, 1993, p. 3). Esmonde (2009) categorized practices in her study as collaborative “when group members put their ideas together, worked together, and seemed to act as ‘critical friends’ when considering one another’s ideas” (p. 256). One specific method of using collaboration in the classroom is through collaborative test taking. Bloom (2009) studied the effectiveness of allowing students a second opportunity to take a test using collaborative group work. She found that “the second attempt not only reinforced learning through repeated exposure to course content, but it served as a review session” (p. 219). Bloom noted that test scores were much higher, and students became energized during group work. Another way to look at collaboration or collaborative learning is as a form of active learning. Ueckert and Gess-Newsome (2008) described active learning as the need for students to engage with one another and the content they are studying. They also added that
increasing active learning “allows students, rather than teachers, to take responsibility for the work” (p. 52).

Survivor Algebra was developed as a collaborative learning program. Davis (2007) described Survivor Algebra as a program designed to get students working in groups and to develop self-learning skills. Studies support the effectiveness of using some form of collaborative learning. A study examining two high schools, one traditional and one non-traditional, showed strong evidence that the non-traditional school was “better able to serve the motivational needs of adolescent students” (Johnson, 2008, p. ???). The non-traditional school “employed group decision making, credit rather than grades, non-compulsory attendance and greater proportions of collaborative work” (Johnson, p. 69). The results showed that “schools should consider providing a variety of instructional methods with particular attention to higher proportions of collaborative learning experiences for adolescent students” (Johnson, p. 83). Another study done with college students showed that, when proper team-building was used, “students overwhelmingly reported a positive perception of their team performance and a positive attitude toward academic teamwork in general” (Kapp, 2009, p. 142). The results revealed that 93% of the students shared these positive feelings.

**Keys to Success**

There are important keys to consider in making collaborative learning a success. A recurring theme from literature is that students form a sense of
community with one another. In their study, Jones and Jones (2008) discussed the use of icebreakers to help students learn to “work together as a learning community” (p. 2). Ares (2008) also mentioned community along with the importance of students maintaining “responsibility, interdependence and expectations of participation” (p. 105). Hmelo-Silver and Barrows (2008) also discussed the idea of collaborative learning groups as a community and explained that “all participants must contribute” (p. 49). In a short example, Esmonde (2009) showed the significance of group practices being evenly distributed amongst students:

Tony, Sarah, Mustafa, and Kendra are working together on a mathematics problem. From the teacher’s vantage point at the front of the room, they look extraordinarily productive; their heads are bent together, they are engaged in animated discussion, and Sarah’s hands gesture toward her own paper as well as Kendra’s. As the teacher circulates around the room, she pauses to observe and listen closely to the talk. Tony and Mustafa are both writing, heads down, in their notebooks. The teacher hears Sarah explain her strategy for solving the problem as she gestures toward her notebook and the diagrams she has written there. She hears Kendra tell Sarah, “Oh…I get it. But I did it a different way. What do you think? I chose——” and then notices Sarah’s gaze drift back to her own paper as she begins working on the next question. (p. 250)
The students were placed in a group without being given specific tasks. They were unable to benefit from the collaborative approach due to this lack of direction. Ms. Belle, a sixth-grade teacher, understood this. She subscribed to a system where she would assign students as “leaders, assistants, recorders and sergeants-at-arms for group assignments” (Ares, 2008, p. 106). Foster and Theesfeld (1993) supported the ideas that decisions on size of groups, seating arrangements, team assignments, student collaboration, lesson plans, and daily task management are crucial components in successful group work. Ciani, Summers, Easter, and Sheldon (2008) argued that when students are allowed to choose their collaborative groups they are more motivated than if the groups were chosen by the teacher.

**Role of Teacher**

“It is likely that the goal of all professors using collaborative learning as an instructional tool is to promote adaptive peer relations among students” (Ciani et al., 2008, p. 634). To attain this goal, educators must know their roles and follow several guidelines. Gaining the trust of students is vital for teachers to be able to educate through collaborative learning. Davis (2007) suggested how this can be accomplished and commented that “the quickest and easiest way to build trust is to show the kids that you genuinely care about them” (p. 27). Furthermore, Davis stated the importance of getting to know the names of students to earn trust.
According to Foster and Theesfeld (1993), the following teacher responsibilities are important when using collaborative learning:

1. Carefully explain the task so that each team knows its responsibilities. It may clarify the task for students if you write the instructions on the chalkboard or the overhead projector.

2. Monitor student work and behavior.

3. Answer questions only when they are team questions, and provide assistance when necessary.

4. Interrupt the group process to reinforce cooperative group skills or to provide direct instruction for all students.

5. Provide closure for the lesson.

6. Evaluate the group process by discussing the actions of team members at least twice each week. This is called processing.

7. Help students to learn to be individually accountable for learning. This should be reinforced regularly.

8. Monitor team progress and give praise when appropriate. (p. 3)

Brown and Renshaw (2006) found that “the conventional classroom locates teachers in privileged spaces where they can see, be seen, and influence all aspects of classroom activities” (p. 248). With this in mind, the role of the educator is changing. Teachers now assign responsibility to the students asking “what does the student need to do to learn this material” (Salter, Pang, & Sharma,
2009, p. 28). Staples (2007) summarized the teacher’s role in student collaboration with the following: “Supporting students in making contributions; establishing and monitoring a common ground; and guiding the mathematics” (p. 172).

**Role of Students**

Along with responsibilities for the teacher, Foster and Theesfeld (1993) listed the roles and responsibilities for students in collaborative learning. They stated the following:

1. Students understanding that they are part of a team and are all working toward a common goal.
2. Team members understanding that the successes or failures of the team will be shared by all members. Therefore, each member must learn to contribute as much as possible to the group goal.
3. All students learning to discuss problems with each other in order to accomplish the group goal. Contributions from each member of the team may be significant in the solution of a problem.
4. Team success being dependent on, and being a direct effect of, the individual work of each member of the team.
5. Learning that capitalizes on the presence of student peers, encourages interaction among students, and establishes positive relationships among team members.
6. Learning that requires the guidance of a teacher who can help students develop the cooperative learning skills they need, understand group work dynamics, and learn mathematics by working in groups.

7. Teams asking for help only after each team member has considered the question.

8. Helping students to be individually accountable for their own learning.

(p. 3)

According to Jones and Jones (2008), Dr. Paul Vermette concluded that a strategy to help positive relationships to occur between his students during collaborative learning “was facilitating the understanding that mutual respect and cooperation was a requirement among group members, not an option” (p. 4). Dr. Vermette created expectations for his students, and through this process “he allowed students to take ownership for their own learning experiences” (Jones & Jones, p. 8). A study by Brown and Renshaw (2006) concluded that when student participation through collaboration is used in the classroom, students “were beginning to act as authors of ideas” (p. 257). Ultimately, the students were becoming active rather than passive learners.

Summary

Since Survivor Algebra has a collaborative learning approach, it is important to discuss what exactly is meant by collaboration. Collaboration involves working as a unit to complete the task at hand. Having a sense of
community is important in successful collaborative learning. This builds trust and comfort amongst group members. The expectations and roles of the teacher and the students must also be discussed to understand if the use of Survivor Algebra can be effective in the classroom. To be effective, students must be actively involved, and the teacher must be a facilitator of events while allowing the students to be self-learners. These are the building blocks for a positive and advantageous experience for all in collaborative learning, and in this specific case, Survivor Algebra. In the following chapter, I discussed the methodology that will be used to complete the collaborative learning through Survivor Algebra project.
Chapter Three

Research Design and Method

My study will involve using portions of the Survivor Algebra program to create a collaborative learning environment in my Algebra 2 classroom. I am looking for a way to make learning mathematics more enjoyable and interesting for my students. I want to increase their motivation to learn mathematics and achieve higher rates of success in my classroom. In this chapter, I discussed my plans for applying my adaptation of Survivor Algebra to my Algebra 2 classroom. I also described the methods used for analyzing my results.

Setting

My entire six year full-time mathematics teaching career has been at my current location. There are approximately 60 students in grades 7-12. Teaching at a small school has been an excellent experience which has allowed me to become very close with my students. I view my school as an extended family, and I feel lucky to be here. Since I grew up in a small Midwest town, I believe I have an accurate perspective on what life is like for my students. I feel very comfortable using my Algebra 2 students for this study. It is a class of nine students with eight juniors and one senior. I have been teaching most of them since they were in the seventh grade. During this time, we have been able to build strong relationships with each other.
In using Survivor Algebra, I will split my Algebra 2 class into two groups or tribes of balanced abilities. I will have to make some adjustments if I lose or gain any students, but I do not foresee this as an issue. Also, I want this collaborative learning experience to feel like something new to my students. I am hoping that even though the students know each other well, and they are used to working together in groups, this experience can still be accomplished. This can also be beneficial, since I do not plan to spend much time teaching them how to work collaboratively.

**Intervention/Innovation**

I will be implementing a version of Survivor Algebra in my Algebra 2 class for nine weeks. The rules I will be using for the project are adapted from Davis’ (2007) *Survivor Algebra User’s Guide*. They are as follows:

1. Students will be ranked according to their first semester grades. This ranking will be used to place the students into two tribes or groups of balanced abilities. Students will remain in the same tribe for all nine weeks.

2. Individuals may be removed from a tribe if they are disruptive. These individuals will still work in the same tribe, but they will lose all privileges that come with being in a tribe.
3. The tribes will compete in challenges (Algebra 2 tests) during the nine weeks. To win a challenge, a tribe must have the highest average challenge score. In the case of a tie, each tribe will receive the prize.

4. The prize for winning a challenge is one bonus point for each tribe member. The point will go toward their test grade. A winning tribe member will be excluded from the prize if his/her score is below 80%.

5. Tribes will compete collaboratively in a variety of pre-challenges (test reviews). Each member of the winning tribe will receive two bonus points that will go toward their daily grade.

6. Individuals will remain in their tribe for any group work done throughout the nine weeks.

7. Tribal members are encouraged to interact and help each other with daily work. Successful daily work will breed success for the tribe during challenges.

8. A final challenge will be given at the end of the nine weeks. This challenge will cover material from the entire nine weeks. Any tribe member with an overall grade of 90% or above will be in the running to become the Survivor Algebra winner. The tribe member that fits this criterion, and receives the highest final challenge score, will be crowned the winner. The winner will receive a million dollars (ten 100 Grand bars) and a movie gift card. In the event of a tie on the final
challenge, the tribe member with the highest overall grade for the nine weeks will be given the win. Second and third place will be given a five dollar coupon for healthy snacks.

**Design**

My approach for this study will be mixed-methods, leaning more heavily toward qualitative. When I compare my students’ first semester grades with their third quarter grades, the study will lean toward quantitative. Since third quarter gets more advanced than the first semester of Algebra 2, the comparison of grades will only be a small portion of my analysis. Students will be given a survey before and after the study concerning their opinions on collaborative learning. I will also keep a journal throughout the study and use my own observations for analysis. The results from the survey and my observations will be dissected using a broad or qualitative path.

**Description of Methods**

Students used as participants will be informed of the purpose of the study, the duration of the study, and the methods used to collect and analyze data. The Institutional Review Board (IRB) approved letters in Appendix A will be used to acquire informed consent from the students, parents, and administration. Participating students and the school will maintain total confidentiality. During the course of the nine week study, I will collect three main sources of data: individual grades, surveys, and observations.
At the outset of the nine weeks, the students will be given a survey on collaborative learning. The survey utilizes a 4-point Likert scale, which has students rate each question on a strongly agree to strongly disagree continuum. The questions are meant to gauge opinion on collaboration through group work. The survey will also measure how individuals deal with working in groups. Along with the questions that use a Lickert scale, there are two open-ended questions that ask students to list their likes and dislikes about group work. Students will use their prior experiences to answer the questions.

A journal will be kept throughout the nine weeks. I will monitor student reactions and feelings during the implementation of Survivor Algebra. A close eye will be kept on how involved students are getting, their confidence levels, and their overall performance in class. I will be looking to determine whether Survivor Algebra is having a positive influence in my classroom. I will use my opinions gained through observation to determine how well I believe any given situation is going. I will also use the journal to document my thoughts and observations on the implementation process, including successes, challenges, things to change for the future, and things to continue.

At the end of the nine weeks, students will once again take the survey. This retake will be used to determine whether there is a change in students’ attitudes toward collaborative learning after using Survivor Algebra. The same questions asked previously about group work will be asked specifically about
Survivor Algebra. Students will also be asked what they would change about Survivor Algebra. I will do a qualitative analysis of these new results. The survey and both sets of questions are included in Appendix B. My process of data collection and analysis will greatly depend on these results. The results from the Likert scale portions of the pre- and post-survey can be found in Appendix C.

The Algebra 2 grades from first semester will be compared with the grades acquired during the nine week period of Survivor Algebra. I will be looking for an increase in an overall grade and test grades for each student. The collection of this data will be no different than before my implementation of this project.

**Expected Results**

I want my students to come away from the study with positive feelings toward Survivor Algebra. My hope is that no matter their feelings before the study, they truly have learned to enjoy and appreciate collaborative learning. I believe that I will see my students become motivated to learn mathematics. I expect them to become successful group members, and I plan to see an overall increase in achievement.

There are some potential obstacles that could cause me some difficulty in completing a successful study. Students might not take the surveys seriously, so I could be collecting false data. The change in student grades may be insignificant. The tribes I form could make for a bad mix of personalities, making for a long nine weeks. With the Algebra 2 material becoming more advanced over the
course of the year, student struggles may be incorrectly linked to Survivor Algebra. I feel I can overcome these obstacles with my understanding of mathematics and my students.

**Timeline for the Study**

The study will begin the first day of the second semester. It will take place during the entire nine weeks of the third quarter, from January 3, 2011 to March 11, 2011.

**Summary**

A modification of Survivor Algebra will be used with my Algebra 2 class. The students will be put into tribes, and over the course of nine weeks they will work collaboratively. The students will work together on assignments, activities, and they will compete for the top group score on tests. I will analyze the use of Survivor Algebra mainly using surveys and observations. I will also be doing a comparison of grades. I expect my students to become more involved in class and achieve higher success. The next chapter includes the results of the study.
References


Kapp, E. (2009). Improving student teamwork in a collaborative project-based course. *College Teaching, 57*(3), 139-143. doi: 10.3200/CTCH.57.3.139-143


Appendices
Appendix A

Parental, Principal, and Student Consent/Assent Forms

The Impact of Collaborative Learning through Survivor Algebra in the Mathematics Classroom

Invitation to participate: Your child is invited to participate in a study of the use of a structured collaborative learning approach. The study will examine how the implementation of the Survivor Algebra program impacts student motivation and achievement. It will also compare student opinions toward collaborative learning before and after using Survivor Algebra. This study is being conducted by Peter Wang, mathematics instructor at Fairmount Public School, and a graduate student at Minot State University.

Basis for Subject Selection: Your child has been selected because he/she is in Mr. Wang’s Algebra 2 class. Your child’s class was chosen because the class size and age level are appropriate for the study. If everyone agrees to participate there will be nine students who meet the criteria for the study.

Overall Purpose of Study: The purpose of this paper is to help me improve my teaching methods by using a structured collaborative learning approach. The main goal of utilizing Survivor Algebra is to determine if it will have a positive effect on my students and their learning and enjoyment of math.

Explanation of Procedures: If you decide to allow your child to participate, he/she will be asked to do the following:

a. Work in the same group during classroom activities and test reviews for nine weeks.

b. Take tests that could have a positive impact on the entire group. The tests are scored individually, but the individuals in the group with the highest average test score will receive a bonus point. This is considered winning a challenge.

c. Take two surveys and answer four open-ended questions about his/her opinions on collaborative learning and Survivor Algebra.
The identity of all participants will remain confidential. All research will be done in the classroom. The implementations will occur during the nine weeks of the third quarter.

**Potential Benefits:** Each participant will learn collaborative strategies that will hopefully carry over to real world situations. My goal is for students to become motivated to do well, to better understand the material I am teaching, to get involved, to improve their test performance, and to have fun in the process.

**Alternatives to Participation:** If you decide to not allow your child to participate, he/she will still take the same tests during class, but will not be required to take the two surveys and answer the four questions. Their test scores will not be factored in for the group average, and I will not collect data from my observations of their group work.

**Compensation for Participation:** Bonus points will be awarded to individuals if their group wins a challenge. Bonus points will also be given when a group wins a test review, which is called a pre-challenge. At the end of the nine weeks, a final challenge will be given. Students receiving the top three scores on the final challenge will all earn prizes.

**Assurance of Confidentiality:** The identity of all participants and their data will remain confidential and stored in a locked file cabinet or on a password-protected computer. Any data collected will not be linked to the participants or the school district in any way. Following the study and completion of my master’s degree, all data will be destroyed.

**Withdrawal from the Study:** Your child’s participation is voluntary. Your decision whether or not to allow your child to participate will not affect his/her grade. If you decide to allow your child’s participation in the study, you are free to withdraw your consent and discontinue participation at any time.

You should feel free to ask questions now or at any time during the study. If you have questions, you can contact Peter Wang at 701-474-5469 or peter.a.wang@sendit.nodak.edu. If you have questions about the rights of research subjects, contact the Chairperson of the MSU Institutional Review Board (IRB), Brent Askvig at 701-858-3052 or Brent.Askvig@minotstateu.edu.
Consent Statement:

You are voluntarily making a decision whether or not to allow your child or legal ward to participate. Your signature indicates that, having read and understood the information provided above, you have decided to permit your child or legal ward to participate. You will be given a copy of this consent from to keep.

Participant (please print student name)

Signature of Parent or Guardian       Relationship to subject       Date

Researcher’s Signature       Date
The Impact of Collaborative Learning through Survivor Algebra in the Mathematics Classroom

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Basis for Subject Selection: You have been selected because you are in Mr. Wang’s Algebra 2 class. Your class was chosen because the class size and age level are appropriate for the study.

Overall Purpose of Study: The purpose of this paper is to help me improve my teaching methods by using a group learning approach. The main goal of using Survivor Algebra is to determine if it will have a positive effect on my students and their learning and enjoyment of math.

Explanation of Procedures: If you decide to participate, you will be asked to do the following:

a. Work in the same group during classroom activities and test reviews for nine weeks.

b. Take tests that could have a positive impact on the entire group. The tests are scored individually, but the individuals in the group with the highest average test score will receive a bonus point. This is considered winning a challenge.

c. Take two surveys and answer four open-ended questions about your opinions on collaborative learning and Survivor Algebra.
The identity of all participants will remain confidential. All research will be done in the classroom. The implementations will occur during the nine weeks of the third quarter.

**Potential Benefits:** Each participant will learn collaborative strategies that will hopefully carry over to real world situations. My goal is for students to become motivated to do well, to better understand the material I am teaching, to get involved, to improve their test performance, and to have fun in the process.

**Alternatives to Participation:** If you decide not to participate, you will still take the same tests during class, but will not be required to take the two surveys and answer the four questions. Your test scores will not be factored in for the group average, and I will not collect data from my observations of their group work.

**Compensation for Participation:** Bonus points will be awarded to individuals if their group wins a challenge. Bonus points will also be given when a group wins a test review, which is called a pre-challenge. At the end of the nine weeks, a final challenge will be given. Students receiving the top three scores on the final challenge will all earn prizes.

**Assurance of Confidentiality:** The identity of all participants and their data will remain confidential and stored in a locked file cabinet or on a password-protected computer. Any data collected will not be linked to the participants or the school district in any way. Following the study and completion of my master’s degree, all data will be destroyed.

**Withdrawal from the Study:** Your participation is voluntary. Your decision whether or not to participate will not affect your grade. If you decide to participate in the study, you are free to discontinue participation at any time.

You should feel free to ask questions now or at any time during the study. If you have questions, you can contact Peter Wang at 701-474-5469 or peter.a.wang@sendit.nodak.edu. If you have questions about the rights of research subjects, contact the Chairperson of the MSU Institutional Review Board (IRB), Brent Askvig at 701-858-3052 or Brent.Askvig@minotstateu.edu.

**Student Assent:**

You are voluntarily making a decision whether or not to participate. You signature indicates that, having read and understood the information
provided above, you have decided to participate. You will be given a copy of this assent form to keep.

___________________  ___________
Signature of Participant  Date

___________________  ___________
Researcher's Signature  Date
Dear Mr. Townsend:

I am completing work toward the Master of Arts in Teaching: Mathematics degree through Minot State University. As a degree requirement, I need to conduct a research project in my classroom during the third quarter of this year. I will examine how the implementation of the Survivor Algebra program impacts student motivation and achievement. I will also compare student opinions toward collaborative learning before and after using Survivor Algebra. To accomplish this I would like to use my adaptation of the Survivor Algebra program with my Algebra 2 class.

Each student would be asked to complete a survey and answer open-ended questions regarding their attitudes toward collaborative learning and Survivor Algebra before and after the nine-week implementation. I will also be taking notes on my own observations.

Survey responses, observations and test scores will be analyzed and the results will be included in my paper; however, no individual participants will be identified by name. Standard classroom confidentiality will be observed regarding all data collected. I will ask each participant to include their name on all surveys for the purpose of comparing the results, but be assured that a student’s responses will in no way impact his or her grade in my class.

I have prepared a letter to notify parents of this project and asking for their permission to use the surveys completed by their student in my study. A copy of this letter is attached for your inspection. I am requesting that you permit me to carry out this research in my classroom. Please contact me at peter.a.wang@sendit.nodak.edu or 701-474-5469 if you have any questions. Thank you for your consideration.

Sincerely,
Peter Wang

_____Permission for Peter Wang to conduct research in his classroom is granted.

_____Permission to conduct this study is denied.

Signature_______________________________________ Date__________

Mr. Jay Townsend, Fairmount Public School Principal
## Appendix B

### Collaborative Learning Survey and Open-Ended Questions

Collaborative Learning Survey:

SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

<table>
<thead>
<tr>
<th>Question</th>
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Open-Ended Questions (Pre Survey):

1. Explain what you like about group work.

2. Explain what you dislike about group work.
Open-Ended Questions (Post Survey):

1. Explain what you like about Survivor Algebra.

2. Explain what you dislike about Survivor Algebra.

3. What would you recommend to improve Survivor Algebra?
Appendix C

Survey Results

Pre Survey Results:

SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

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