

THE EFFECTS OF SINGLE-GENDER GROUPS ON BROADCAST VIDEO PRODUCTION STUDENTS

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ABSTRACT

The purpose of this study was to determine the effects of single-gender grouping on Broadcast Video Production (BVP) students. Students in two first year broadcasting classes created a 45-sec Public Service Announcement (PSA) on bullying. One class consisted of the treatment of single-gender groups ($N=24$) while the other consisted of mixed-gender groups ($N=21$). Data was collected over 6-weeks and compared. Behavioral Checklists were used to determine which groups or gender remained focused on the project, and a Group Perception Questionnaire was given at the end of the study to establish student attitudes about group formation. Using a video rubric a statistically significant difference was found between the mean score of boys ($M=77.3$) and girls ($M=75.8$), but the comparison class of mixed-gender groups ($M=78.1$) scored higher than students in the treatment class of single-gender groups ($M=76.4$).

INTRODUCTION

Public education across the United States has changed dramatically since its inception. When American schools were first created, no one intended that everyone would learn at high levels (Schlechty, 2005). However, the stakes in education today are much greater; school systems, administrators, and teachers are held accountable for students' overall academic achievement. Ways to improve achievement are constantly researched and implemented. Because boys and girls learn differently and gender-specific personality traits affect how they learn, single-gender education may be an answer for improving academic scores (Costa, Terracciano, & McCrae, 2001). With schools searching for what works to increase students' academic performance, the use of single-gender schools, classrooms, or groups seems to be an innovative structure (Ferrara, 2010). The pressure to improve academic scores is present in all areas of learning. Single-gender grouping at the research site proved to be an effective initiative for improving academic performance in Broadcast Video Production I.

Broadcast Video Production I was a class that relied heavily on the outcome of video projects. Many projects were seen by the student body and community; therefore, quality projects were imperative to the success of the program.

Before the study began, student projects were completed in mixed-gender groups at the research site. These groups were collaborative in nature, but evidence suggested that all

group members were not working equally to provide ideas, resources, and time. The lack of involvement among group members was indicative in the quality of their final projects. Verbal altercations about ideas and lack of involvement among the group led some members to stop participating. Research indicated that if implemented correctly, single-gender grouping improved academic performance in both boys and girls in addition to decreasing behavioral problems (Sax, 2005). Another focus of single-gender education was the way boys and girls learn within groups. Most researchers agreed that everyone's approach to learning was different. Within Broadcast Video Production I, students were routinely placed in groups to complete tasks. Fortunately, most students, boys and girls alike, enjoyed learning in groups. However, gender research indicated that males and females approach working in groups differently. Knowing how the genders were differently affected drastically changed the climate of the video production classroom.

Student diversity was another interest of research within single-gender education. Four years ago, students taking Broadcast Video Production needed it to graduate. They were receiving Tech Prep diplomas and consisted mostly of minority students of low socioeconomic status. Today, students choose to take this class, but because of the low economic status of the community, most students still receive free and reduced lunch. In addition, these students come from a variety of cultural backgrounds. These students are considered at-risk leading the school to implement plans to increase their academic performance. The School's Improvement Plan (2010) states, "The diverse nature of the population requires culturally responsive teaching" (p. 11). Culturally responsive teaching allows teachers to use cultural knowledge, prior experiences, and performance styles of diverse students to improve their educational experience (Gay, 2000). Single-gender education is one component of culturally responsive teaching. Not only does single-gender education group specific-genders together, but single-gender education also linked specific cultures, knowledge, and performances to one another. Likewise, single-gender education can increase the achievement of at-risk students and improve self-concept and esteem (Bracey, 2006).

Very little research was conducted within the social context of the public high school as a site for examining single-gender education. Until 2002, the government made it difficult for federally funded schools to implement single-gender education. Some people believed that the No Child Left Behind (NCLB) legislation allowed local schools to implement single-sex programs. This legislation permitted local schools to use innovative program funds to support single-gender classes, but declared that the Department of Education should issue guidelines for such programs (Klein, 2005). Guidelines made by the United States Department of Education (2004) involved the amendment to Title IX which usually prohibited single-sex schools or classrooms on the basis of discrimination to those receiving federal funds. This amendment to Title IX allowed for more flexibility in the area of single-gender education. Title IX amendments authorized the separation of students by gender if these classes or schools were created for the purpose of remediation, support, or to improve the overall educational outcomes of students (US Department of Education, 2004).

Schools now have to provide rational for single-gender classes, offer a coeducational class in the same subject as the single-gender class, and complete a review every two years on the effectiveness of single-gender education (National Association of Single Sex Public Education, 2011).

Before NCLB, most schools with single-gender education were of a private nature; therefore, making research within the public education system difficult. Privatization along with the limited amount of time single-gender education has been allowed in the public school system was just one reason why single-gender education needed to be focused upon.

Another reason for added focus on single-gender grouping was very little research has been conducted within a Trade and Industry (T&I) classroom. Research was found to support single-gender grouping in the traditional academic setting, such as math and science. These settings were where it has been suggested that boys dominated in a coeducational setting (Sullivan, Joshi, & Leonard, 2010). Broadcast Video Production was part of the T&I department at the research site. Research examining single-gender grouping in the Broadcast Video Production classroom helped fill the void of current educational research in this field.

To determine which group, boys, girls, or mixed, produced higher quality work in the Broadcast Video Production classroom, the use of single-gender groups, the collection of data, and involvement of first year broadcasting students as participants within the research were examined. With this research, administrators and other teachers within the T&I department could implement changes in grouping that improved overall productivity and performance within these project-based classes.

REVIEW OF LITERATURE

Single-gender vs. mixed-gender education. When No Child Left Behind (NCLB) was implemented in 2002, regulations for single-gender education relaxed allowing schools to offer single-gender classes. The rules stated that if a class was offered to one gender, the same class had to be offered to the opposite gender in the form of co-educational or single-gender classes (Deweese, 2007). The Secretary of State at the time noted that research for single-gender education proved to help some students learn better (McFarland, Benson, & McFarland, 2011). Thus the debate, would single-gender education be more effective than mixed-gender education?

Research in single-gender and mixed-gender education suggested that there are positives and negatives to both environments. According to Leighton (2010), single-gender classrooms helped create learning environments that were favorable to the academic achievement of those students. Both boys and girls were positively affected in single-gender educational environments, and should be given equal opportunities to learn (Herrelko, Jefferies, & Roberston, 2009). Leighton's research on teacher perspectives about single-gender education proved beneficial in the argument that single-gender classrooms were advantageous. Single-gender classes helped develop more confidence and broader interests in the students. Similarly policymakers claimed that single-gender classes allowed students to focus better and learn through gender-suitable approaches (Thiers, 2006). Additionally, single-gender settings improved behavior, attendance, and participation, thus increasing overall academic performance (Hughes, 2006).

Research conducted by Dewees (2007) found that single-gender education did not always prove to be the best solution for improving student performance. There were no significant gains in either genders performance based on grades given to individuals in single-gender groups, thus supporting a mix-gender educational setting.

Mixed-gender classrooms were academically beneficial to both genders and learning to work with the opposite sex gave students more confidence (Deweese, 2007). A mixed-gender setting is more reflective of how society actually works (Thiers, 2006). Mixed-gender education allows students to develop interpersonal skills in order to interact with individuals of the opposite sex (Hughes, 2006). Challengers of single-gender education believe that boys and girls need to learn how to get along in the world and separating them would take away that opportunity (Vail, 2002).

An agreement on single-gender versus mixed-gender education has not been reached. Some research indicates that boys and girls perform just as well in a single-gender setting as they would in a mixed-gender one. When taking into account social backgrounds, prior performance, and other factors there tends to be little difference in students' performance in single-gender or mixed-gender settings (Smyth, 2010). Further research into which is a better choice needs to be conducted before an accurate decision can be made regarding whether single-gender education is better than mixed-gender education.

Attitudes About Single-Gender Education

For educational programs to be successful there must be a level of acceptance from everyone involved. Single-gender instruction is no exception. Administrators and parents seem to accept and understand the merit of single-gender classrooms relatively easy. However, the support for single-gender education by parents, students, and teachers has a mixed review.

Although parents, students, and teachers do not make the ultimate decisions in educational programming for schools, their opinions must be highly valued for these programs to be successful. Students and teachers are judgmental of single-gender education, whereas, parents are the most supportive. Attitudes of students and teachers are affected by external factors. They are more concerned with the changes in what once was than results. Although research indicates a marked improvement in students' academic performance and on task behavior, some students do not support single-gender classrooms (DePape, 2006). DePape (2006) found through surveys and questionnaires given to students and teachers that students did not feel that single-gender classes had merit. Students are neither enthusiastic nor cooperative in transferring to single-gender education after experiencing a mixed-gender educational setting (Herrelko et al., 2009). According to the survey and questionnaire data collected by DePape, the teachers began to feel frustration because they constantly had to defend the idea of single-gender education. For teachers the normal pace of the school year seems to be what affects their attitudes about single-gender education along with a lack of professional training in the concept (Spielhagen, 2011).

Parents seem to be the most supportive of the idea of single-gender education. In research conducted by DePape (2006) about the effects of gender specific classrooms on academic achievement, parents had initial concerns. However, after seeing the results of single-gender classes on their children's academic performance parental support increased. Likewise, parents of children in a school district in Ohio voluntarily enrolled their children in a school that was conducting educational reform using a single-gender format (Herrelko et al., 2009). The final result of the enrollment was the school was filled to capacity and had a waiting list of potential students. Parents understand that single-gender education takes away distractions and gives students the most opportunities to learn. They are not directly affected by the changes like their children or the teachers making single-gender education easier to support.

Differences In Gender

While one's attitude about any given idea affects its outcome, so does how individuals learn, and boys and girls learn differently. Because students learn differently, teachers need to embrace the different styles of learning to ensure all students' needs are being met (Matthew-Cadore, 2010).

"Gender helps create a set of environmental expectations and transactions unique to boys or girls" (Matthew-Cadore, 2010, p. 6). Several factors contribute to the uniqueness of the different genders and the learning styles of boys and girls. Learning differences in boys and girls is more than anatomical differences in the brain as McFarland, Benson, and

McFarland (2011) seemed to suggest in their study. Boys and girls have different social experiences and needs (Weil, 2008).

When taking into account how students learn, teachers need to be mindful that there are gender differences and make adjustments accordingly. These differences in gender makeup indicate that differential learning environments could be advantageous for boys and girls (McFarland et al., 2011). Males and females in mixed-gender settings may feel inadequate and unprepared for the material being taught because of these social differences, thus making single-gender education an option for an alternative learning environment (Kommer, 2006). Teachers must embrace the different intelligences in order to meet the needs of all students (Matthew-Cadore, 2010). Gender-based strategies appeal to the biological and developmental differences in males and females (Gourdreau, 2010).

Technology Improvement

Considering the different learning styles of males and females because of their composition, the way technology is introduced to students, particularly female students, is just as important as why technology is introduced (Donaldson, 2010). Females are falling behind in this field and need to become more technologically advanced. By high school girls are less likely to enroll in computer classes because they have a low opinion of computer usage. Donaldson (2010) found in her study on computer usage that gender stereotypes have placed females in traditional roles and steered them away from careers in technology. In the 20th century females were less likely to enroll in computer science classes or be employed in technology related fields (Burke & Murphy, 2006). Females make up half of the workforce, yet only about 15% are mathematicians, scientist, or engineers (Friend, 2006).

As the areas of technology become increasingly broader so does the gap between males and females. Student experiences with technology may be related to gender. Boys play more computer games than girls, making males more capable and less afraid of technology. Girls take less technology courses in high school allowing males to overshadow females in technology related courses (Heemskerk, Dam, Volman, & Admiraal, 2009).

Burke and Murphy (2006), found through questionnaires, interviews, and focus groups that females in a single-gender technology setting learned more and began enjoying the use of technology. Friend (2006) defended this research and stated that attitudes about technology improved when females were placed in single-gender settings for this subject (Friend, 2006). Girls must become more involved with technology as it is becoming increasingly important in everyday life. Educators need to make certain that females become more involved in technology fields (Burke & Murphy, 2006).

To adequately meet this need in the field of technology, single-gender classes for females need to be implemented in computer environments.

Increase in achievement. If students, especially female students, perform better in single-gender classes for technology, should this approach be investigated in implementation in other areas of study? With strenuous testing and the threat of failure, educational stakeholders want to determine what works to improve the academic shortfalls that are occurring in every school across the nation.

In an effort to raise academic levels, school districts are giving more attention to single-gender classes (Herrelko et al., 2009). With research indicating that students' educational experience varies by gender, single-gender education may be the answer to increasing academic scores (Hubbard & Datnow, 2005). Students enrolled in single-

gender education show academic gains compared to those in a mixed-gender setting (Hoffman, Badgett, & Parker, 2008).

Along with improved academic achievement, single-gender classes are a means of improving behavioral issues and overall respect for the school (Jackson, 2009). Studies show positive effects of single-gender education in increasing test scores and graduation rates (Thiers, 2006). With increased academic achievement, behavior, graduation rates, and school pride, single-gender education should be the new answer to improving overall student achievement.

PURPOSE STATEMENT

At the beginning of each school year, schools in the State of Georgia that did not meet Annual Yearly Progress (AYP) were required to send out letters informing parents or guardians of the school's status. They had to offer a means for improving the status of the school as well as an alternate school for the students to attend that had better academic achievement levels. Of course no school wanted to send these letters. This process was detrimental to the overall school climate and left administrators, teachers, and students with little pride in themselves or their school.

The low socioeconomic status of students along with a large diverse student population compromised the AYP status of the site in which this study took place. The school had not met AYP in five years and had been identified for restructuring. Arrangements were made to run the school differently.

The urgency to improve students' performance in all academic areas was not only a need but also a requirement. Research suggested that single-gender education may be a means of improving academic performance in some subjects and an effective practice for improving overall academic achievement. The purpose of this study was to examine the effects of single-gender grouping on Broadcast Video Production students. The vital need to improve student performance made this study's purpose even more pertinent.

RESEARCH QUESTIONS

- Research question 1. Will single-gender groups increase the quality of video projects produced by Broadcast Video Production students?
- Research question 2. Which gender group's performance will be most affected by single-gender grouping?
- Research question 3. Will students' perceptions of single-gender grouping be different from their perceptions of mixed-gender grouping?
- Research question 4. Will students' on-task behavior be different in single-gender groups as compared to their on-task behavior in mixed-gender groups?

DEFINITIONS OF VARIABLES

Throughout this study there were variables that needed to be taken into consideration. The variables and their definitions are as follows:

Broadcast video production (BVP). Broadcast Video Production is a class that is offered at some high schools in Georgia.

In this class students were taught a variety of skills in video production. These skills included but were not limited to editing, shot composition, camera angles, directing, and script writing.

A positive group environment is vital to the overall outcome of productions. Rarely are productions in the video world conducted individually.

Single-Gender Groups

Single-gender groups are groups that are made of boys only or girls only.

Mixed-Gender Groups

Mixed-gender groups are groups that comprise of both males and females.

Gender

Gender is the characteristics that distinguish between male and female. Gender is not biological difference as it is determined more by tasks, functions, and roles associated with males and females (Hesse-Biber & Carger, 2000).

Video Project Performance

Video project performance is a student's ability to produce an edited project complete with video footage that has been shot by the student or their group members. Video project performance was measured by a rubric created to address the areas that need to be improved.

Student Perceptions

Student perceptions are how the students understand or view something. In this case, student perceptions were about the differences in single-gender groups compared to mixed-gender groups. Students' perceptions were measured through the use of surveys and/or questionnaires.

Student Experiences

Student experiences are how the students personally observe or encounter single-gender groups. Students' experiences were measured by surveys and/or questionnaires.

METHODS

Setting and Participants

The school where the research was conducted was a Title I high school in a rural section of South Georgia. According to the Governor's Office of Student Achievement (2010), there was a total of 1,675 students enrolled at the school with 49% being White, 28% Black, 20% Hispanic, and the remaining 3% was represented by those of multi races or of the Asian descent. Over half of the student population (60%) received free or reduced-price lunch.

A total of 45 10th through 12th graders participated in this study once permission to continue was granted by the administration. These students were chosen for this study because they were in their first year of Broadcast Video Production (BVP). The treatment class consisted of 24 students and was compared to another class that consisted of 21 students.

Students were selected to take BVP based on course selection and scheduling. Most students in BVP choose to take the class during the registration phase, which was offered spring semester. However, a few students were placed in this course because of scheduling conflicts. BVP I was the first in a series of three classes. Students who took this course learned the basic skills in preproduction, production, and postproduction. They met 5 days a week for 50 min.

First year broadcasting classes were selected for the study because the students had not begun editing and all students were on the same learning level. The study included the

students working on their first projects from beginning to end. Projects consisted of script writing, creation of a storyboard, gathering of video footage, and editing. Demographics for each class are found in Table 1. Racial make up for the classes was similar, as was the number of boys and girls for both classes. Students that received special services or were classified as disabled were minimal in each class.

Table: 1
Demographics for Treatment Class and Comparison Class

Demographic		Treatment Class	Comparison Class
Race	White	11	7
	Black	7	10
	Hispanic	6	4
Gender	Boys	9	9
	Girls	15	12
Students with Disabilities Services (504)		2	1
		1	0

Intervention

Single-gender grouping was provided to a class of 24 10th through 12th grade students during a daily 50-min class period. These groups were selected by the teacher-researcher based upon responses given on a survey and consisted of three students each.

These students were compared to students in another Broadcasting I class of 10th through 12th graders that were placed in mixed-gender groups. Both classes were similar in size, ethnicity, knowledge, and ability. After being assigned to groups, the students were to work together for a total of 6 weeks to create a 45-s public service announcement (PSA) on bullying.

Prior to the intervention, the students learned basic concepts of preproduction, production, and post-production. Such concepts included industry terminology, the proper use of a video camera, angles and shots, audio, television script writing, and storyboard design. These concepts took the student's half a year to learn and master. The students' knowledge and understanding of these industry techniques were vital to the success of the study. The students had to use previously acquired skills along with their newly acquired knowledge of editing in order to be success on the bullying PSA.

At the beginning of spring semester, students in the treatment class and control class were given Parental Consent Forms which explained the study to the parents and required their signature to continue. Parents were also asked to sign an informed consent release for the teacher-researcher to conduct a survey and questionnaire with their child. All forms were signed and returned by the end of that week, which allowed for the study to begin.

Once permission was granted from the parents, the students were asked to sign a child assent form. When these forms were signed, all 45 students were given a Technology Use Survey (Appendix D). This survey was used to determine the students' knowledge of computers and specific programs that were used in the BVP classroom. Based on answers provided on the survey, students were placed into groups of equal ability by the teacher-researcher.

Before being placed into groups, the students in both classes had to learn the process of editing. The teacher-researcher spent 3 days going over the basic concepts of editing. The lessons included a tutorial video, handouts, and a review sheet about the editing software, Final Cut Pro X. Students watched the video and asked questions, were given the handouts to work on, and received review sheets that answered common questions.

Once students listened to the lessons, they were placed at computers to practice with the software themselves. Students used videos that were already imported into the program to practice basic concepts such as trimming video, making a video sequence, adding audio and inserting transitions. They spent 4 days learning the editing software. After becoming familiar with the editing software, students were allowed to ask any questions that may have arisen while practicing editing.

After the 4 days of practice, students were then placed into groups. Students in the treatment class were placed into single-gender groups based on their responses to the Technology Use Survey. There were a total of eight groups and consisted of three students each. Likewise, the control class was placed into groups using answers provided on the Technology Use Survey, but this class consisted of seven groups of three students.

Following the formation of groups, the teacher-researcher explained the assignment to both classes. Students were to work together to complete a script, storyboard, gather footage, and edit that footage to create a 45-s PSA.

The teacher-researcher explained that they would be given 6 weeks to complete the all portions of the assignment. The teacher-researcher assured the class that she would be available to help, but that the help would be limited and have to be shared with the entire class as well as the other BVP I class. The sharing of information provided both classes with the same instruction and allowed the study to remain valid. Likewise, the Video Rubric (Appendix A) was given to the students so they would be aware of elements required for the PSA.

During the 6-week intervention phase, the teacher-researcher took observational notes using the Observational Checklist (Appendix C). The collection of notes provided evidence of on-task behaviors. Behavioral notes were taken daily for every student involved in the study. Questions arose during this time period in both classes. However, every question that was asked was shared with the class as a whole at the end of the period as well as the other BVP I class involved in the study.

At the end of the 6-week period the students were asked to turn in all assignments to the teacher-researcher before leaving class that day. Students in both classes were graded on what was completed to that point. The teacher-researcher began grading the projects using the same Video Rubric that was given to the students during the formation of groups. Grades on final projects were compared in the treatment class to determine if boys or girls produced better quality video projects. These grades were then compared to the control class of mixed-gender groups to determine which groups, single or mixed, produced the highest quality work in the Broadcasting classroom.

Observational notes for the behavior checklist were analyzed and used to establish which groups remained on task. The treatment class was compared to determine which single-gender group, boys or girls, behaved better during the given task. Additionally, the behavioral notes were compared to the control class to reveal whether students in a single-gender or mixed-gender setting remained on task the most.

After completing the 6-week assignment, all 45 students who participated in the study were given a Group Perception Questionnaire (Appendix B). This questionnaire provided

the teacher-researcher with valuable information about each student's attitude about their group formation and assignment. Answers provided on the questionnaire were analyzed and compared to determine how members of both groups single or mixed, felt about the project and grouping arrangement.

Data Collection Techniques

To determine if single-gender grouping was effective on Broadcast Video Production students, three forms of data collection were used by the teacher-researcher.

Video Rubric

Teachers use rubrics as a means of assessing student work and justifying grades assigned to students (Andrade, 2000). Furthermore, rubrics support student learning and serve as an evaluation and accountability tool. The Video Rubric was created by the teacher-researcher to serve two functions. One function of the rubric was to determine which groups, mixed or single, performed better on the task of creating the public service announcement videos on the topic of bullying. The rubric was used as an evaluation tool to compare mix-gender and single-gender group projects to projects created in the broadcasting classroom prior to the implementation. By comparing the groups, it could be concluded that single-gender grouping may well increase the quality of video projects.

The second function of the rubric was to determine which single-gender group, males or females; performance was most affected in the single-gender setting. Numerical grades were analyzed and used to conclude which group functioned better in the single-gender setting. It was established that the higher the grade, the better the group's performance.

A copy of the rubric can be seen in Appendix A and was given to all students involved in the study before the intervention began. Giving a copy of the rubric to the students before the start of the project provided the students with the information required to create quality PSAs. The final video took students in both the treatment and comparison class 6 weeks to complete. Once the projects were completed, the teacher-researcher used the rubric to evaluate the projects. Numerical grades were compared for each group and analyzed using descriptive statistics and an unpaired one-tailed *t*-test. Along with the comparison of projects by the intervention and comparison classes, the rubric determined which gender group was most affected by single-gender grouping.

The treatment class and comparison class received the information, assignment, and rubric in exactly the same fashion. There were no differences in how the students were instructed or deviation from the rubric when grading the final project, helping to ensure validity and reliability.

Group Perception Questionnaire (Appendix B)

As a follow-up to the intervention, students in both classes were required to complete a 12-response questionnaire about their perceptions of their group composition. This questionnaire was developed by the teacher-researcher and includes two demographic questions, four basic yes or no questions, and six responsive statements to questions that were answered previously within the questionnaire. All questions were used to determine student attitudes about their group assignment and composition with the exception of the two demographic questions, which were used to determine the gender of the student and their group arrangement, both of which were vital to the study.

Questionnaires were used as a comparison of the intervention and control groups. The comparison was made in perceptions and attitudes about group composition. Likewise, responses were used to determine patterns among the different groups. Data was analyzed using descriptive statistics to compare the mean percentages of answered questions.

Observational checklist (Appendix C)

During the implementation of the intervention, a checklist was used to determine appropriate and inappropriate behaviors of all students participating in the study. Three behaviors were observed each day for a 6-week period. These behaviors were remains focus on project, working well with group members, and stays within group (does not visit with other groups). This checklist was created by the teacher-researcher as way of determining which students in particular groups did what was asked of them without having to be redirected. When the student was observed not behaving appropriately, an 'X' was placed in the column of the inappropriate behavior next to the student's name.

All behavioral checklists were reviewed at the end of the study and analyzed to determine which groups remained focused on their projects, worked well with others, and remained within their groups.

The results of the checklist were compared between students in the single-gender and mixed-gender settings. This comparison data was analyzed by comparing checklist totals.

Technology Use Survey (Appendix D)

The Technology Use Survey was given to the students prior to the intervention and consisted of 10 questions created by the teacher-researcher about the student's knowledge of specific computer programs and their familiarity with computers.

The information gathered from this survey was not analyzed to determine significance or measured for statistical reasons. Rather, the information provided on the survey allowed the teacher to place students in appropriate groups. By conducting the survey and comparing the responses, the teacher-researcher was able to equalize group composition. Since group formation was created bases on student knowledge of computer usage, groups were comparable in their computer use skills.

RESULTS

During the course of the study the teacher-researcher conducted research to determine the effect of single-gender grouping on Broadcast Video Production (BVP) students. Two classes of first year broadcasting students were compared during the course of the study. A total of 45 students in grades 10-12 participated.

The treatment class consisted of 24 students, and the comparison class contained 21 students. There were 9 boys in each class and 15 girls in the treatment class with 12 in the comparison group. The treatment class was used to create 8 gender-specific groups, while the comparison class consisted of seven mixed-gender groups.

Data collection instruments used to determine the effects of single-gender grouping on broadcasting students were a Technology Use Survey, a Video Rubric, and observational checklists. Further insights into student perceptions about their group formation were determined upon completion of this study through the use of a Group

Perception Questionnaire

Students in both the treatment and comparison classes where taught at the same level and given the same information. Prior to the implementation of single-gender groups, the classes were learning how to edit video on the computers using Final Cut Pro X. Each class was taught in the same format. They both watched a tutorial video and were given time to practice editing on the computers before the implementation began. All students involved in the study had previously been taught how to use the video cameras, different camera angles and shots, script writing, and storyboard design.

Once time was given to practice editing, the implementation began with the students in treatment and comparison classes taking the Technology Use Survey. This survey asked questions about the students' ability to use certain computer programs and their overall use of computers.

As seen in Table: 2, all students involved in the study had similar knowledge of digital editing and access to a computer prior to the intervention.

Table: 2
Comparison of Student Responses to Technology Use Survey

Statement	Treatment Class			Comparison Class		
	Yes	No	Some	Yes	No	Some
Do you have access to a working computer and internet?	95.83%	4.16%	0%	100%	0%	0%
Are you comfortable using computers of media projects?	75%	25%	0%	85.71%	14.28%	0%
Do you know how to use digital editing systems to create video?	25%	66.66%	8.33%	0%	95.23%	4.76%

Likewise, students who took this survey were asked how often they used the computer. Of the 24 students in the treatment class, 16 students (67%), 10 girls and 6 boys, use the computer daily. Five students (21%), two girls and three boys, use the computer weekly, and less than 13% use the computer two to four times a week or seldom.

Seventy-six percent of students in the comparison class that use the computers daily with 11 of them being girls and 5 boys. One girl and three boys (19%) of the 21 students used the computer weekly, and 5% used the computer two to four times a month or less.

The most common computer programs or applications in both the treatment and comparison classes that the students used on the computer were YouTube and the Internet, with some knowing how to operate Audacity. All students ($N=45$) involved in the study used the computer for entertainment purposes. The digital editing software that 38.1% of the students were familiar using was Windows Movie Maker. None of the students used Final Cut Pro X before the practice phase in the classroom.

With this information, students in the comparison and treatment classes were placed in groups of three to complete the assignment of creating a 45 sec Public Service Announcement (PSA) on bullying. All groups were formulated based on knowledge of computers, so the groups would be equal in their ability to create these PSAs.

Once the groups were selected by the teacher-researcher, students began working on their projects. They were to create a script, storyboard, gather video, and edit the gathered video to create the final bullying project. Students were given the video rubric before getting started, so they would be aware of the requirements.

While students were working, the teacher-researcher observed three specific behaviors. These behaviors were: (a) remains focused on project, (b) works well with group members, (c) and stay within group. If students were observed not complying with these behaviors, an X would be placed by their name for that day.

The intervention lasted a total of 25 days, and there were a total of 50 checklists, 25 for each class. Table 3 shows the number of times students in the treatment and comparison classes were observed not complying.

Table: 3
Incidences of Non-Compliance

	Remains focus on project	Works well with group members	Stays within group
Treatment Class			
Boys	73	14	42
Girls	19	7	11
Comparison Class			
Boys	69	37	21
Girls	25	19	12

The 9 boys in the treatment class were observed doing something other than the project 73 times during the 25 day intervention. These other observations included sleeping, drawing, listening to music, and doing homework for other classes. There were only 19 observed incidences of the girls not remaining focused on the project within the treatment class. These students were seen writing notes and doing homework for other classes.

The results were similar in the comparison class ($N=21$). The boys ($N=9$) who were focused on the project were observed sleeping, drawing, talking about other things other than the project, and homework for other classes. The girls ($N=12$) were seen talking about other things other than the project and doing homework for other classes. Students were uncertain how to work in groups and split the between the members. One would write the script, while the others waited instead of working together to create something that was everyone's idea. Students in the treatment class were observed being uncooperative with group members 21 times, with boys' nonconforming 14 times and girls 7. This inability to work well with group members was attributed to arguments over ideas and lack of involvement.

Likewise, students in the comparison class were noncompliant towards group members 56 times. Like the treatment class, students in this class argued over ideas and lack of involvement, but it was stated by several boys that the girls in the groups were "too bossy". A conclusion can be made that boys and girls get along better with members of their own gender, and boys are more vocal about their ideas in groups that contain girls.

When it came to staying within the group and not visiting other groups, students in the treatment class were observed being noncompliant the most ($N=53$). Students in the comparison class were seen visiting other groups 33 times. Boys in the treatment class were observed leaving their groups more often ($N=42$) than girls ($N=11$). These boys and girls were seen talking to friends in other groups. Like the treatment group, boys in the comparison class were seen leaving their groups ($N=21$) more than girls ($N=12$). Again, these students were observed talking with friends in other groups.

It was determined that boys in both the treatment class of single-gender groups and the comparison class of mixed-gender groups had the most difficulty staying within their own groups.

After the 25 day intervention phase, students had to turn in their completed PSAs on bullying. These PSAs were graded using the video rubric that was given to every student at the beginning of the implementation.

All groups ($N=14$) were given numeric grades. Table 4 compares the means and standard deviations for grades assigned to the different groups in the treatment and comparison classes.

Table: 4
Comparison of Grades in Treatment and Comparison Classes

Group Contrast	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i> -value	<i>p</i>
Treatment Class	8	76.4	9.5	-0.42	0.34*
Comparison Class	7	78.1	5.9		

$p < .05^*$

Students scored higher in the comparison class ($M=78.1$, $SD = 5.9$) than the treatment class ($M=76.4$, $SD = 9.5$). The difference in means was statistically different. This data provides evidence that suggests single-gender grouping is not an effective method of instruction in the Broadcast Video Production classroom.

In Table: 5, a comparison of means and standard deviations is made in the grades of those placed in gender-specific groups.

The mean for PSA grades assigned to boys ($M=77.3$, $SD = 9.7$) was higher than the mean for PSA grades assigned to girls ($M=75.8$, $SD = 10.5$), a statistically significant difference.

This data suggests that boys are better at using technology to create video projects.

Table: 5
Comparison of PSA Scores for Boys and Girls in Treatment Class

Group Contrast	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i> -value	<i>p</i>
Boys	3	77.3	9.7	0.21	0.42*
Girls	5	75.8	10.5		

$p < .05^*$

The final phase of the study was to give the 45 participants a questionnaire about their group formations.

This questionnaire consisted of three demographic questions (gender, race and type of group) and responses to four yes, no, or sometimes questions.

Table: 6 shows the results of the yes, no, or sometimes questions in percentages.

Table: 6
Results of Group Perception Questionnaire

Question	Treatment Class			Comparison Class		
	Yes	No	Sometimes	Yes	No	Sometimes
Did you enjoy working with group members?	100%	0%	0%	100%	0%	0%
Was your group successful at completing the assigned task?	100%	0%	0%	100%	0%	0%
Did everyone in your group participate in the project?	92%	8.3%	0%	96%	4.7%	0%
Would you prefer working with people that are the same gender as you?	25%	25%	50%	76.2%	0%	24%

Students enjoyed working with their respective groups for various reasons. The boys in treatment stated reasons such as “they were fun people to work with and we had great chemistry with each other” and “we get along together”. Girls’ responses to why they enjoyed working in groups were all similar statements about having good ideas and working well together.

In the comparison class students enjoyed working in groups because “Everyone cooperated” and “It was people that I got along with and wasn’t scared to act in front of them”. Statements about working with groups were mostly about having fun and liking their group members within the class with mixed-gender groups.

Students in both the comparison and treatment classes felt that group ideas and participation were the reasons for the successful completion of the assigned task. Students stated, “Everyone did their part”. When asked if everyone did their part, student responses were mixed. Ninety-two percent of the students in the treatment class felt that students did do their part within the group, while 8.3% felt some group members did not do enough.

Those that felt students did what they should have within the group thought so because everyone “Shot some, all on camera, all edited”. All boys ($N=9$) within the treatment class felt their group members equally participated; whereas the some of the girls ($N=2$) believed some group members did not contributed as much as some of the other group members. The girls stated, “I felt that some people did more work than others. One member liked to talk to another group a lot” or “Two people did most of the work, but the other just stayed quiet and went by what the other partners said”.

The students shared their ideas about working in groups that were specific to their gender. While 25% of the treatment class would either like to work with those of the same gender or not, 50% stated that they would like to work others of the same gender sometimes. The students stated that it did not matter what gender someone was when it came to working in groups.

Students in the comparison class would rather work with those of the same gender or work with them sometimes. Some students in this class believed that working with students of the same gender would make it “Easier to settle with certain things”. Other

students felt that working with those of the same gender on occasion allows them to become more comfortable with a variety of classmates. Comments such as these provide evidence that students would rather work with people of the same gender. However, these students were in the comparison class working in groups of mixed-gender. They became frustrated with one another because ideas were not easily accepted by their peers and some in the groups did more work than others. Students in the single-gender setting had more of a negative perception to working with students of the same gender; whereas students in the mixed-gender setting were 76% more likely to want to work with others of the same gender.

Students suggested that group members listen more and participate fully in the project in order for the group to function proficiently. Students in both the treatment and comparison classes also recommended that they choose group member in the future in order for them to be successful. When students were forced to work with individuals they did not want to work with, it caused friction among the groups leading to poor project performance. Student perceptions were that allowing them to choose their own groups would improve the overall climate of the BVP classroom. In the future, students would be allowed to choose their own group members with exceptions. Students would have to provide solid evidence as to why they should be allowed to work with particular individuals. By affording students the opportunity to choose and explain their reasoning for choosing these groups, students would be more apt to work harder, stay focused on their work, and produce higher quality video projects.

DISCUSSION & CONCLUSIONS

Over the course of 6-weeks, students in two different broadcasting classes planned a 45-sec Public Service Announcement (PSA) by writing scripts, creating a storyboard, gathering video, and editing. Both classes were in their first year of Broadcast Video Production (BVP) and were taught the same concepts prior to the intervention with neither of them having learned how to edit. Prior to the intervention, students in these two classes were given the opportunity to practice editing with the Final Cut Pro X system after watching a tutorial on how to operate the editing software. After practicing for several days, the intervention began.

The study began with the teacher-researcher giving each student in these two classes a Technology Use Survey (See Appendix D). According to answers provided on the survey, the teacher-researcher formed groups. One class of first year BVP students was placed in single-gender groups ($N=8$). This class became the treatment class. The other class of first year broadcasting students, were placed in mixed-gender groups ($n=7$) and became the comparison class. The purpose for the different group formations within the different classes was to determine if single-gender grouping had an effect on Broadcast Video Production (BVP) students.

During the implementation, three forms of data collection were used to gather information about single-gender groups within one BVP classroom and mixed-gender groups in another BVP class. The two classes would be compared to determine if single-gender grouping was effective. These instruments included a video rubric, observational checklists, and a Group Perception Questionnaire.

Every day during the implementation, observations about each group in both classes ($N=15$) were made. A checklist was used to determine if students were focused on the project, worked well with group members, and stayed within their own groups. Students in the treatment and comparison classes were seen not remaining focused on the project 186 times over the course of 25 days. Boys in both settings were observed being noncompliant most often (Boys in the single-gender class and mixed-gender class were

unfocused 76% of the time, while girls were unfocused only 24% of the time. Likewise, the boys in the treatment and comparison classes were observed having issues with group members 66% of the time. Boys in the single-gender and mixed-gender classes were also seen leaving their groups to talk to members of other groups 63 times, whereas the girls were observed only 23 times.

Boys in the single-gender setting were observed being unfocused and staying within their groups more than boys in the mixed-gender setting. However, boys in the mixed-gender setting were seen not getting along with their group members most often with occurrences happening 37 times compared to the girls 19.

Although the girls were seen not complying on several occasions in the three areas, their incident rate was not as frequent as the boys. The girls in the mixed-gender setting ($N=9$) were seen being noncompliant most often. Girls were unfocused 25 times, caught not getting along with group members 19 times, and leaving their groups to visit other groups 12 times. Girls in the single-gender setting ($N=9$) were observed being unfocused 19 times, not getting along with group members 7 times, and not staying within their group 11 times.

It was determined that boys' on-task behavior in single-gender groups was worse than those in mixed-gender groups. This evidence is inconsistent with Hubbard and Datnow (2005) who concluded that a single-gender setting would free students from distractions of the other genders and allow them to focus on their lessons in meaningful and new ways. However, girls' on-task behavior was better in a single-gender setting than in a mixed-gender one. This evidence supported the theory of Hoffman and Badgett (2008) who concluded that girls in single-gender settings work well together, actively discuss with one another, encourage each other, and are excited about the content.

At the end of the 6-week period, all PSA projects on bullying had to be turned into the teacher-researcher to be graded. Grades were given to students based on the video rubric which provided further evidence of student performance. Student performance on the bullying PSA in the comparison class ($M=78.1$) was significantly higher than the scores on the bullying PSA in the treatment class ($M=76.4$). It was concluded that single-gender groups did not have an effect on BVP students.

Data from the video rubric indicated that boys outperformed girls in the single-gender setting. Boys ($M=77.3$) scored significantly higher on the bullying PSA project than girls ($M=75.8$) disproving the assumption that males are becoming a disadvantaged gender in schools (Friend, 2006). However, evidence from the video rubric suggests that gender may be a factor in the varying experiences students have with technology (Heemskerk et al., 2009). The final form of data collection in this study was the Group Perception Questionnaire. One hundred percent of the students ($N=45$) liked working with their assigned groups, and every group was successful at completing the task of creating a 45-sec PSA on bullying.

When asked if they would rather work with people that are of the same gender, 25% of the students in the treatment class of single-gender groups responded with yes. However, 50% of the students in this same class said sometimes providing reasons such as it allows them to become comfortable with their classmates. This reason supports the idea by Smyth (2010) that suggests that boys and girls are more content in a mixed-gender setting. Students feel that it is a more natural environment and allows them to form relationships with their classmates.

However, unlike the treatment class, 76.2% of the students in the comparison class felt that working with people that are of the same gender would be advantageous. According

to the data collected from these questionnaires it depended on which class the student was in on how they perceived single-gender grouping compared to mixed-gender grouping.

Impact on Student Learning

As Leighton (2010) pointed out, single-gender settings help create an environment that is beneficial to the academic achievement of students. This idea was supported at the research site because prior to the intervention student video projects in Broadcast Video Production (BVP) were subpar in a mixed-gender setting. Girls in BVP were less confident with the technology used in the classroom than the boys (Heemskerk et al., 2009). These two reasons provided enough evidence to implement single-gender groups in the BVP classroom to determine if it would have an effect on student learning.

Although girls responded that they used computers and were comfortable with editing software on the Technology Use Survey, it was apparent that girls in the single-gender setting were afraid to take risks and uncertain about the different aspects of the video project. Girls ($M=75.8$) scored significantly lower than the boys ($M=77.3$) in the single-gender class. Unlike the boys in the single-gender setting, the girls remained focused, within their respected groups, and got along more. Boys wanted to venture into the groups that contained only girls and talked a lot about other things other than their projects. Even with the boys not doing what was asked of them most often, the girls were unable to overcome their fears and produce the better projects even though their pre-planning ideas were better than the boys.

Students in the comparison class of mixed-gender groups ($M=78.1$) scored higher than those in the single-gender setting ($M=76.4$). It was observed that students in mixed-gender groups argued more than those in single-gender groups. The boys complained that the girls were too bossy, and the girls claimed that the boys were lazy. The girls in single-gender groups did most of the planning and writing of the script. Girls were observed telling the boys what to do on several different occasions. The boys were told what type of video footage to get, how to draw something, and to get different items many times. However, when it came time to edit the projects, the boys were the ones doing most of the work.

The roles were now reversed with the boys telling the girls what to do. During the editing phase, the girls were observed unfocused and not remaining within their groups more than the boys. It can be concluded that the girls felt inadequate to the boys and allowed them to take control at this point reassuring the notion that educators need to make certain that females are proactive when it comes to becoming more involved in technology related fields (Burke & Murphy, 2006).

Factors Influencing Implementation

Several factors influenced the implementation of the intervention. Although student absences were low, there were a few groups that were affected by these. Of the seven groups in the comparison class, one group was missing a member at least two times a week over the 6-week period. The treatment class had the more absences than the comparison class. One group was missing a member for 5 days because of suspension, and another group had a member miss 7 days off and on because of various illnesses. The return from a two week Winter break also interfered with student learning. Two students in the treatment class were added to the roster. Although they were included in the study, they were at a disadvantage from the beginning because the other students had been in the class together since the first of the year. They already knew each other, so regardless of how groups were formed they were comfortable with one another. Student instruction was affected by the absence of the teacher-researcher. On 5 different days, the teacher-researcher was away from the classroom. Two of those days away from the

classroom were because of professional development, while the other three were because of their own children being sick. Although, the students continued with the instruction, and the substitute took observational notes, the students did not benefit from having the actual teacher in the classroom to answer any problems that may have occurred.

Implications and Limitations

The implications of this study are important for the research site and other teachers within the Trade and Industry department. Although it was concluded that single-gender grouping is not an effective strategy in the Broadcast Video Production (BVP) classroom, it is believed that students learn differently and when teachers begin to teach to these learning styles, students will begin to achieve more (Matthew-Cadore, 2010). For this research, students in both the treatment class and comparison classes were taught in the exact same manner. Both classes watched a tutorial on the editing software, were given time to practice, and time to ask questions. All questions that were asked were answered and shared with both classes. Implications of this study go beyond the research class. Other Career Technical Agricultural Education (CTAE) classes could use the findings to help support their method of group formations as all of these classes require group work and projects. Very little data could be found by the teacher-researcher about single-gender grouping in public schools at the high school level. Most research deals with middle-schools or schools in the private sector. Although single-gender grouping did not affect BVP students, there are a few limitations that must be addressed. The study was conducted over a 6-week period. Not only was this not a significant amount of time, but it was also the first time students in these classes had edited a project. It would have been more beneficial to allow the students to adequately learn the editing software before implementing the research. Allowing the students to become proficient with the editing software would have allowed the students, especially the girls, to gain more confidence in their ability to work the technology used to create video projects.

The teacher-researcher was impacted through this study. Although single-gender grouping did not provide evidence of success, other group formation options were provided as successful measures. In a class where effective grouping strategies is imperative, evidence of successful grouping measures is useful. Some of those group formations were groups formed by their peers, boys and girls who were dissimilar in authoritative styles working together and groups that were constructed of individuals who were at different learning levels.

The concepts of video do not change; however, the technology used to create videos does. Realizing that students understood the concepts but were afraid of the technology used to turn these concepts into visual pieces will help improve student achievement. Likewise, it was stated by several students that allowing them to choose their own groups would help them be successful. Choosing their own groups would allow students to partner with people that are strong in certain aspects and help those that are weak in those areas.

Further research is needed to validate the findings of this study. When dealing with single-gender groups, teachers should receive specific training on the difference of the genders. Since there were days when the teacher-researcher was not in attendance and the substitute took observational notes along with the other limitations of the study, the results may not be completely reliable. Research into single-gender groups for a longer period of time across several classes at the high school level would make the results more reliable.

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**Appendix A
Video Rubric**

	1 point	2 points	3 points	4 points
Script	Contains more than 10 mistakes. Not in correct format.	Contains 5-10 mistakes. In correct format.	Contains 1-4 mistakes. In correct format.	Contains no mistakes. In correct format.
Overall Content	Message is unclear.	Message is vaguely communicated	Message is clearly communicated	Strong message.
Camera Technique	Always contains badly framed shots, bad camera focus, extreme use of pans and zooms, or an unsteady camera.	Sometimes contains badly framed shots, bad camera focus, extreme use of pans and zooms, or an unsteady camera.	There are few or no noticeable problems with camera technique.	No noticeable camera problems. The video was shot in an interesting and appropriate way.
Audio	Is either overpowering or too soft. Background noise makes it almost impossible to hear the primary audio.	There is some background noises that distracts the viewer and/ or the audio has inconsistent volume.	There is no distracting background noises. The audio is consistently the same volume. The primary audio can be heard easily.	The project appropriately mixes different types of audio and has extreme clarity.
Editing	The project presents long video sequences with no obvious editing.	The video appears to be minimally or sloppily edited. There are awkward transitions between scenes.	The video is generally well-edited, but lacks some continuity and polish. There are few or no awkward transitions between scenes.	The video has a professional appearance and the video is edited in a way that makes the project interesting. The project has good continuity.
Time	More than 10 sec. over or under.	6-10 secs over or under	1-5 secs over or under.	Exactly 60, 45, or 30 secs
Copyright	Uses more than 45 secs of copyrighted material	Uses 36-40 secs of copyrighted material	Uses 31-35 secs of copyrighted material	Uses 30 secs or less of copyrighted material
Cooperative Group Work	Cannot work with others. Cannot share decisions or responsibilities.	Works well with others, but has difficulty sharing decisions and responsibilities	Works well with others. Takes part in most decisions and contributes a fair share to group.	Works well with others. Assumes a clear role and shares responsibilities.

Appendix B Group Perception Questionnaire

You will be taking a questionnaire about your groups and how well you think you did on the video project as a group. The purpose of this questionnaire is to better understand your attitude about the type of group you worked with for the duration of the bullying PSA. Before beginning the questionnaire, please read over the questions and think about your answers. There is no right or wrong answer, but all questions must be answered completely and to the best of your knowledge.

1. What is your gender?

- Male
- Female

2. Did you enjoy working with your group members?

- Yes
- No

3. Please explain your answer to #2 in the provided box.

4. How was your group constructed?

- All Males
- All Females
- Mixture of Males and Females

5. Was your group effective at completing the assigned task?

- Yes
- No

6. Please explain your answer to #5 in the provided box.

7. Did everyone in your group participate in the project?

- Yes
- No

8. Please explain your answer to #7 in the provided box.

9. Would you prefer working with people that are the same gender as you?

- Yes**
- No**
- Sometimes**

10. Please explain your answer to #9 further in the provided box.

11. What would you have changed about your group? (You may list anything that you think would have made it more effective. Be honest and sincere with your response.)

12. Please tell me anything else you think I might need to know about how the groups functioned that may benefit the class later.

Appendix C
Observational Checklist

Name	Remains focused on project	Working Well with Group Members	Stays within group (does not visit with other groups)

Appendix D Technology Use Survey

Directions: Please complete the following survey as honestly as possible. Answer all questions and to not leave anything blank.

1. Do you have access to a working computer?

- Yes
- No

2. Do you have access to the internet?

- Yes
- No

3. How often do you use the computer?

- Daily
- Weekly
- 2 to 4 times a month
- Seldom or Never

4. When you use the computer what is it typically used for? (Mark ALL that apply)

- Games
- Email
- Social Networking
- Research
- Word Processing
- Multi-media projects (ie. PowerPoint)
- Other (Please Specify) _____

5. What computer tools (software) do you know how to use efficiently? (Mark ALL that apply)

- Internet
- YouTube
- FormatFactory
- Audacity
- Roxio
- Final Cut Pro X
- Garage Band

6. Are you comfortable using computers for media projects?

- Yes
- No

7. Do you know how to use digital editing systems to create videos?

- Yes
- No
- Some

8. If you answered yes or some to #7, list the systems you have used to edit video within the box.



9. What is your gender?

- Male
- Female

10. What is your race?

- Black
- Hispanic
- White
- Asian
- Native American
- Other (Please Specify) _____