Do Students Achieve Higher Grades When Working Together in Learning Teams than When Working Through Individualized Study Efforts?

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According to Barki and Pinsonneault (2001), research existed concerning the effects of teamwork in the business world. Little data was found concerning the effects of teamwork at the postsecondary level. This study used a descriptive, quantitative, correlation methodology to examine whether any difference existed in final course grades between students working in teams and students working individually. Participants were students in public speaking courses at a small private southeastern liberal arts university. This study failed to show any significant difference at the .05 level, t (78) = .36, p = .73.). Students assigned to groups at the beginning of speech classes (M = 87.43, SD = 6.37) showed no variance from peers working individually (M = 86.96, SD = 5.24).

INTRODUCTION

Teamwork is an emerging concept throughout communities and organizations in the 21st century (Davis & Blanchard, 2004), and interdependence is the basis for all ecological systems (von Bertalanffy, 1969). The success of communities depends on the success of individual members while the success of each member depends on the success of the community as a whole (Godard, 2001). This concept applies to business organizations where the success of each employee contributes to the total success of the organization, and the success of the organization depends on the success of its individual employees. Leaders who plan and think carefully when they select their management style can make a significant contribution to the success of the entire team (Davis & Blanchard).

Much of the research about teams indicated that factors such as self-esteem, personal interest in the tasks assigned, and interpersonal skills are important variables in the success of teamwork. In the educational arena, more research is needed on the subject of teaming versus individual learning. Such research might be helpful to university planners who wish to provide postsecondary students with the most effective learning environments (Davis & Blanchard, 2004).

BACKGROUND OF THE PROBLEM

Postmodern organizations of the 21st century are placing emphasis upon team interaction among employees by assigning them to work on projects in groups (Davis & Blanchard, 2004). In the educational arena, many postsecondary school graduates feel that not enough emphasis is placed on the

teaming process during their postsecondary experience (Davis & Blanchard). According to Davis and Blanchard, students believed they would be better employees if they had more opportunities to learn to work in groups throughout their college experience.

This study was concerned with two types of outcomes from teamwork: (a) learning outcomes in terms of grades, and (b) affective outcomes in terms of improved interpersonal skills, speaking skills, and communication skills. According to a study by Ravenscroft, Buckless, McCombs, and Zuckerman (as cited in Kunkel & Shafer, 1997), very little research is available on the effects of team learning and the affective outcomes of working in groups.

The need for this study arose from the fact that, in business settings, team-learning techniques prevail. Wells and Grabert (2004) argued that it is important to transfer business situations to classroom settings so students feel prepared when they enter the world of work. Industrial and business leaders have been placing greater emphasis on team interaction in the 21st century. By contrast, most university professors employ the traditional lecture format in which the professor verbally disseminates knowledge, and the students have little or no interaction with others during the presentation (Wells & Grabert).

Like employees in organizations, students can learn to interrelate and become interdependent by working in team learning environments, but group learning in the classroom has been documented mainly in the fields of psychology and education (Wells & Grabert, 2004). According to Wells and Grabert, educational institutions need to (a) increase student activities inside and outside the classroom, (b) promote knowledge acquisition and educational performance, (c) increase group-based and cooperative learning, and (d) assist students in developing solutions to real world complex problems.

The disadvantages of working in groups must be considered in depth before making drastic changes in curriculum or teaching methods. According to Wells and Grabert (2004), problems can occur within groups because teaming might not be the most appropriate strategy for achieving a particular goal. Wells also explained that some group members might not fully reach their potential while others fail to contribute their fair share of the work, sometimes from not understanding exactly what is expected of them. In addition, communication problems can hinder the success of group interaction (Wells & Grabert).

Baron (2003) postulated that some team members might have received inadequate preparation in the area of group membership and communication. This lack of experience creates feelings of inadequacy, tension, and even hostility when employees are required to work with other team members in the workplace. Similarly, many students have voiced dissatisfaction with the teaming process (Baron). Miller (2003) coined the term *group hate* referring to the problems encountered when people are required to work in teams without prior study and preparation for the challenges of the team environment.

Time and energy, group conflict, and people problems have been documented as major disadvantages to working in groups. Time and energy must be expanded when planning and supervising group activities. An effective leader spends hours in planning before the actual team meetings begin. Thinking of possible problem areas before the actual group meetings begin can greatly minimize the number of conflicts that typically arise during teamwork (Engleberg & Wynn, 2003). Engleberg and Wynn proposed that, before assigning people to a collaboration effort on a project or problem, the planner should decide whether a group setting is the optimal path to successful goal accomplishment. The leader should also consider the personalities, strengths, and weaknesses of participants before asking employees to work together (Engleberg & Wynn).

Wells and Grabert (2004) stated that conflict within teams could become a major obstacle to the success of team activities. No matter how hard group members try to work together, there is a strong possibility that personal differences might arise among two or more members. Conflict among a few of the group members reduces communication and undermines trust thereby slowing the progress of the entire team (Wells & Grabert).

STATEMENT OF THE PROBLEM

This descriptive, quantitative, correlational study was an examination of whether differences existed between the grades of students who worked in teams and the grades of students who did individual work. The researcher examined the grades of 80 freshmen students in speech classes at a liberal arts university located in the southeastern United States. Half of the students in the study worked in teams, and the other half completed their studies individually. The instructor assigned students to teams randomly. The data from this study might add new knowledge to the existing body of research on the value of team versus individual academic achievements.

PURPOSE OF THE STUDY

The purpose of this study was to examine the efficacy of two learning methods, teamwork and individual study, as determined by the final grades of freshmen students enrolled in one semester of introductory speech at a southeastern United States liberal arts university. The independent variable was assignment to team learning membership. The dependent variable was the final grade of students working in teams relative to the final grade of students working individually. Four sections of students enrolled in introductory speech courses were surveyed. The data obtained provided the statistical information needed to support or reject the hypothesis that students who work in teams achieve higher grades than students who work individually. The quantitative research approach was appropriate for this study because it provided a method to test for a statistically significant difference between grades from two samples.

SIGNIFICANCE OF THE PROBLEM

This study was important because group learning in the classroom has been documented mostly in the fields of psychology and education, and most existing research has taken place in the area of co-operative learning (Leon, 2004). Team learning is a more complex phenomenon than researchers once thought (Holloway, 2003). Postmodern organizations are placing more emphasis on team interaction among their employees by assigning them to complete projects in a group setting (Davis & Blanchard, 2004).

SIGNIFICANCE OF THE PROBLEM TO LEADERSHIP

Postmodern organizations are aware of the areas in which team learning can create a competitive advantage. Top management teams (Wallis & Becerra, 2001), product development teams (Brown, 2002), and self-management teams (Carroll, 2000) are examples of leadership teams that have taken advantage of teaming procedures to achieve organizational success. Since successful leaders are promoting the use of teaming and grouping in business organizations, it is important to question whether college students are receiving enough team experience in their postsecondary education in preparation for the business world. It is critical for students to be adequately prepared to work in team situations after college graduation (Gillies, 2002), so business and educational leaders could benefit from understanding how to deal with the problems inherent in teaming.

Team learning in the classroom can have a positive effect for graduates when they move into a workplace environment. Students who have the ability to be productive team members and become future workplace leaders will have a better understanding of how teaming efforts can help others prepare for success in the 21st century (Brown & Brudney, 2003). According to Holloway (2003), 21st century employers consider the ability to work in teams one of the most important qualities students can display in order to be prepared for success in the modern workplace. This study provided data to help managers decide whether team learning is better than individual learning, and the findings might help administrators determine whether group work leads to more efficient problem-solving, process improvements, and financial savings in their particular environment.

NATURE OF THE STUDY

This study was descriptive, quantitative, and correlational. This approach was selected because it accomplished the goals of the study more efficiently than other methods.

The size of the groups in this study was relatively large since the researcher compared the grades of 38 college freshman speech students who worked in teams with the grades of 42 college freshman speech students who worked on their assignments independently. For the experimental group, students in two randomly selected sections of introductory freshman speech courses were placed in study teams for the entire semester. For the control group, students in the other two class sections worked to accomplish assignments individually.

This study took place during one semester and included four groups of students. For the purpose of this study, a group was defined as one section of students enrolled in the Introduction to Public Speaking course. Each section used the same syllabus. Groupings were not based on age or grade point average, and participants were evaluated using a common grading system. At the end of the semester, the grades of students in the four introductory speech classes were examined to see which group of students achieved higher academic success. Grades from groups of students who participated in the individualized learning approach and grades from groups of students who participated in the team learning approach were compared.

RESEARCH QUESTIONS

This research was based on the assumption that institutions of higher education need to include more team learning in their curricula in order to prepare students for success in 21st century organizations. This study was guided by the following research question: Do students achieve higher grades when working together in learning teams than when working through individualized study efforts?

HYPOTHESES

The following hypotheses were tested in this study:

> *Null Hypothesis H_{o1}: There is no statistically significant difference between the final test grades in students who work in teams and grades of students who work individually.*
>
> *Alternative Hypothesis H_{a1}: There is a statistically significant difference in final test grades between students who work in teams and grades of students who work individually.*

ASSUMPTIONS

An assumption of this study was that the sample of participants was large enough to produce valid data. Four sections of students with 20 to 30 students in each of the four groups provided a sample group composed of 80 students in all. Another assumption was that the groups were similar. The rationale for random selection was that ability, background, or experience should not be factored in the results. Two sections of students worked individually, and two sections of students worked in groups over one semester.

Another assumption was that the study would produce sufficient data to be reliable. All students took three tests and presented four speeches. Written tests were standardized, and the researcher used a common grading rubric to evaluate all speeches in order to control subjectivity and bias. At the end of the semester, the grades of students in the teamed groups were compared to the grades of students who worked individually in order to ascertain which students achieved better academic success. All participants in the study were 18 years of age or older, and they understood that they were participating in

a research study. The rationale for the age requirement was that, since they were adults, they could agree to become participants in a research study without parental consent.

LITERATURE REVIEW

The review of the literature contains a synopsis of relevant sources and research findings on the subject of teamwork and includes a historical overview of early research. Current findings and studies conducted since 2000 were emphasized because teaming is a concept that has gained much interest in recent years. Many researchers have introduced the subject of teamwork, but findings have been inconclusive (Davis & Blanchard, 2004).

It is important to study groups in their natural environment. By emphasizing empirical data, researchers have resisted looking at groups as complex, adaptive, and dynamic systems. Leaders need to find ways of applying empirical and theoretical research data to the strategy of teaming employees (McGrath et al. 2000). Another important consideration is that, at times, researchers place undue emphasis upon theory and subjectivity rather than on actual evaluations of the group effort (McGrath et al.).

Some research has shown that students benefit academically from working in teams (Gillies, 2002). Students in Gillies' research group attained higher achievement in the areas of reading comprehension and math. The students also displayed a more advanced conceptual understanding in the area of science (Gillies). Other growth qualities evidenced by the students in Gillies' study are related to performance at a higher social level. Participants demonstrated a greater ability to remain on task, more willingness to help others in a friendly manner, better involvement in classroom activities, and improved attitudes towards learning. Gillies explained that, when his group members worked interactively with other team members, they created or increased their self-esteem.

Team members face certain issues that include free riders and *ganging up on the task* (Hakkinen, 2004). Free riders are group members who allow the other members to do most of the work or preferably all the work while they sit back, relax, and enjoy the ride and the benefits of the group's successes. *Ganging up on the task* means that the group members collaborate with each other to find ways to finish the project in as little time as possible with the least amount of effort. Both issues are detrimental to group dynamics and prevent the feeling of pride in completing the assigned project in an effective manner (Hakkinen).

Organizations have entered the technological age, so it is important to consider ways in which technology affects teams. Current literature documents problems with the teaming approach specifically occurring when working in virtual teams. Organizations in the 21st century are changing the way in which employees communicate with each other (Chowdhurry et al., 2002). Due to significant advancements in computers and technology in general, virtual communication has become more prevalent in the world of work. Many organizations operate on the assumption that the use of computers for communication automatically enhances a sense of community. Some organizational leaders have further assumed that the use of technology alone creates successful teams. These assumptions are not necessarily correct because of problems connected with virtual communication.

According to Nonaka and Takeuchi (1995), teams are an efficient way to create new knowledge. There are three ways in which knowledge can be gained. First, each member's tacit knowledge must be understood, and each team member must become aware of other team members' expertise in certain areas. Team members might learn about the expertise of peers either through formal study or through informal interaction. Secondly, as team members explore the tacit knowledge of their peers, understanding is reinterpreted until new ideas emerge. Third, team members test the new knowledge that has been created. For example, a team might make a prototype of the new concept. If the prototype proves to be successful, it might lead to the development of a more formal final product (Anand et al., 2003).

Recent research has shown that students benefit from collaborative learning. Students have shown a high degree of improvement especially in the areas of mathematics, reading comprehension, and science. Many social benefits exist as well. Studies provided evidence that students who work collaboratively

show more involvement in the classroom, have higher self-esteem, and have better interactions with others (Gillies, 2002). Collaborative efforts have shown that students with disabilities show improvement within target skills. Working in groups provides disabled students with the necessary resources to build confidence that they might not acquire with individual work. Team learning also helps alleviate feelings of alienation and social isolation (Gillies). New research is attempting to provide information that will quantify the positive effects of collaborative learning, so it is important for researchers to understand what factors influence collaborative achievement.

Research centered on teams and teamwork will continue to be an important area of study in the 21st century. Researchers of the last century provided information through a positivistic approach, creating a body of theory based on the implicit premise that teams are simple, separate, static entities. The field appears to have reached the limit of what can be learned without developing a unifying conception of teams as ever changing. It will be important for future researchers to see teams as a complex adaptive individual and interpersonal process (McGrath et al., 2000).

RESEARCH DESIGN

Student progress was measured by teachers' evaluations of speeches and test results. The university offers four sections of introductory speech courses each semester. Two sections were randomly assigned, and the students in these sections were divided into teams that remained together and worked on course assignments in a team situation during the entire semester. Students in the other two sections completed their assignments individually. All four sections used the same syllabus.

The researcher used a common grading system based on university grading requirements for all four sections. This study took place during one semester, and the final courses grades of four groups of college freshmen were examined to discover whether a difference existed between grades earned by students who worked in teams and those who worked individually. This research was conducted using quantitative analysis in order to further the understanding of using teams in the collegiate environment as preparation for business careers.

DATA COLLECTION

Since the tests were built from a test bank (see Appendix A) that coincided with the university's textbook adoption, the test questions were considered objective and free of bias. The tests were distributed in each class with the instructor and a graduate assistant present to proctor the examinations. The tests were graded by a mechanized Scantron machine, which ensured that the grades were not skewed. The researcher developed the rubric that was used to evaluate the speeches (see Appendix B), and all four sections participating in the study were graded using this rubric. The intent of the rubric was to minimize any subjectivity and bias on the part of the instructor in the grading process. A letter of approval to conduct the study was obtained from the academic dean of the institution.

A two-tailed independent samples *t*-test was conducted to evaluate the hypothesis that students assigned to groups during speech classes score higher than students who worked independently. The test failed to show significance at the .05 level, $\underline{t}$ (78) = .36, $\underline{p}$ = .73. Students assigned to groups at the beginning of speech classes (M = 87.43, SD = 6.37) on average showed no variance from their peers assigned to individual study (M = 86.96, SD = 5.24). Post-hoc analysis was irrelevant due to lack of significance. Figure 1 illustrates the distribution of the two groups. For the given effect size, means and standard deviations, power = .067. Based on this finding, it is expected that 7 % of studies would have a significant result supporting the null hypothesis that states the two population means are equal. All students included in the study completed all assignments. Students dropping the class were not included in the study. The tables included below illustrate the data in detail.

DESCRIPTIVE ANALYSIS OF INDEPENDENT T-TEST DATA

Table 1 includes the mean of each student's grades. The first section explains the individual and team grades for the first required assignment entitled *Self-introduction Speech.* The table includes the mean average for the rest of the semester assignments entitled: Speech 1, Test 1, Speech 2, Test 2, Speech 3, and Exam.

Class Variance Between Group and Individual Differences

The mean score of students working individually was 86.9. The mean score of students working in teams was 87.4. The test failed to show significance at the .05 level, t (78) = .36, p = .73. Students assigned to groups at the beginning of speech classes (M = 87.43, SD = 6.37) on average showed no variance from their peers assigned to individual process (M = 86.96, SD = 5.24).

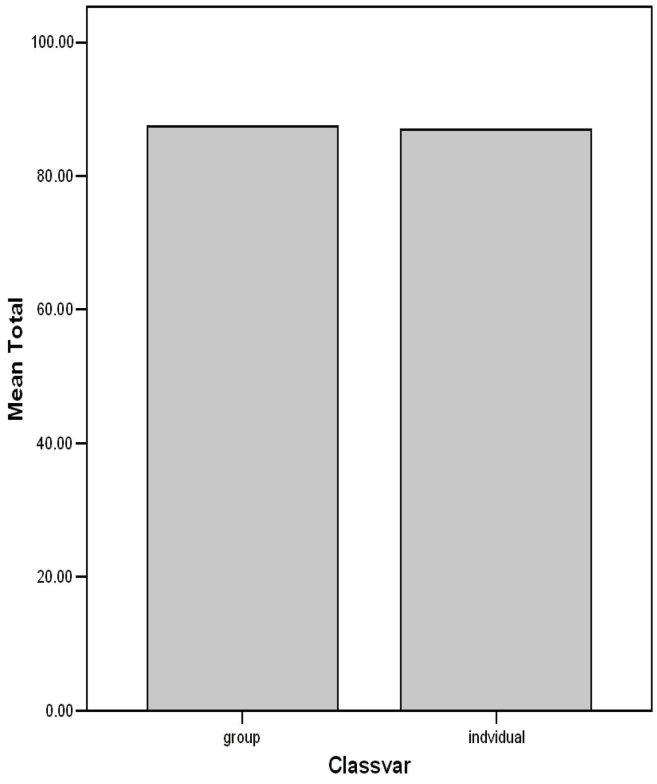
TABLE 1
STUDENT MEAN GRADES

	Classvar	N	Mean	SD	Std. Error Mean
self	group	38	85.26	3.06	.50
	individual	42	85.95	4.56	.70
sp1	group	38	86.737	9.19	1.49
	individual	42	87.24	5.04	.78
test1	group	38	87.45	11.83	1.92
	individual	42	88.21	10.25	1.58
sp2	group	38	87.05	8.98	1.46
	individual	42	84.48	12.95	2.00
test2	group	38	86.89	12.18	1.98
	individual	42	86.00	8.78	1.36
sp3	group	38	90.00	7.48	1.21
	individual	42	89.48	6.76	1.04
Exam	group	38	88.61	9.680	1.57
	individual	42	87.33	9.51	1.47
Total	group	38	87.43	6.37	1.03
	individual	42	86.96	5.24	.81

TABLE 2
INDEPENDENT SAMPLES T-TEST

	t	*df*	*p*	Mean difference	Std. Error of difference
Self	-.79	78	.44	-.69	.88
Sp1	-.30	56.10	.77	-.50	1.68
Test 1	-.31	78	.76	-.77	2.50
Sp2	1.02	78	.31	2.58	2.52
Test 2	.38	78	.71	.90	2.36
Sp3	.33	78	.74	.52	1.59
Exam	.59	78	.56	1.27	2.15
Total	.36	71.83	.72	.47	1.31

FIGURE 1
DISTRIBUTION BY GROUP



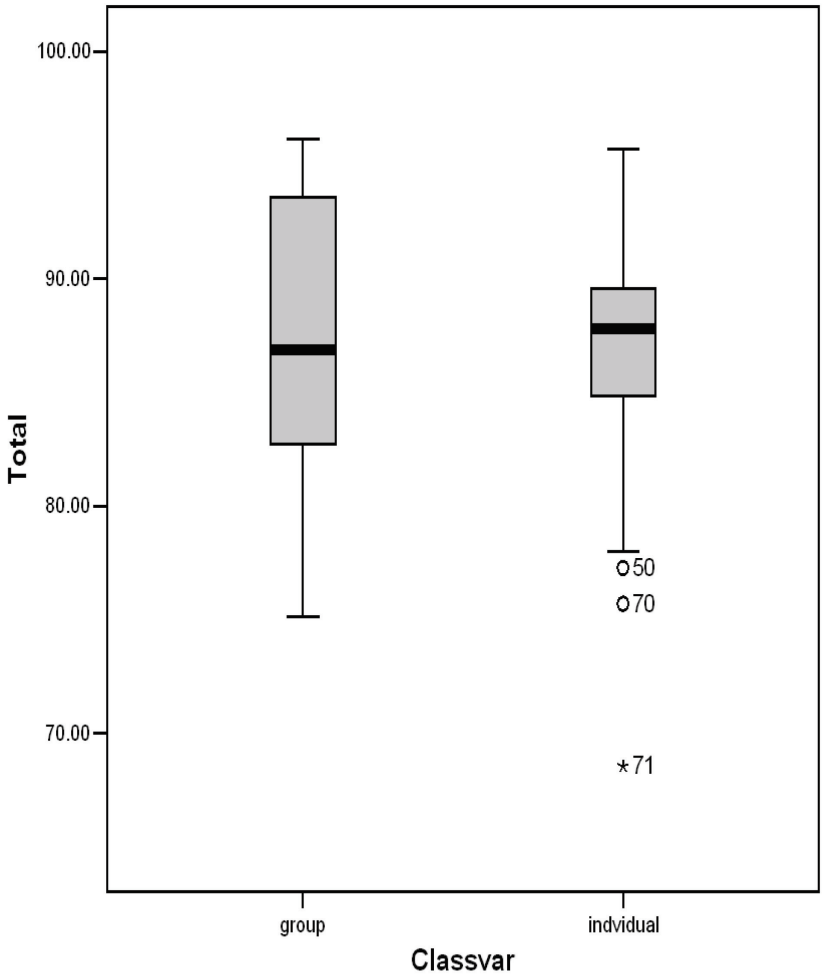
Descriptive Statistics Between Groups (Individual and Team)

The descriptive statistics show that, if there were a statistical difference between group performance and individual performance, the test would have revealed it.

Box and Whisker Plot for Variance of Group versus Individual

This box and whisker plot illustrates the study's findings. Based on these findings, it is expected that 7% of studies would have a significant result supporting the null hypothesis that states the two population means are equal.

FIGURE 2
CLASS VARIANCE BY GROUP AND INDIVIDUAL



SUMMARY

A two-tailed independent samples *t*-test was conducted to evaluate the hypothesis that students assigned to groups during speech classes score higher than students who worked independently. The test failed to show significance at the .05 level, t (78) = .36, p = .73. Students assigned to groups at the beginning of speech classes (M = 87.43, SD = 6.37) on average showed no variance from their peers assigned to individual study (M = 86.96, SD = 5.24). Post-hoc analysis was irrelevant due to lack of

significance. Based on these findings, it is expected that 7% of studies would have a significant result rejecting the null hypothesis that states the two population means are equal. Chapter 5 includes a discussion of the research problem, the purpose of the research, the research methods, and the limitations of the study.

The results of this study do not suggest support for the existing theories about team study at the postsecondary level; instead, they suggest a need for more data comparing the success of team study to individual learning at the postsecondary level. The excitement about the value of teamwork in all situations might be premature, and the theory that teaming in the workplace is the best way to progress might need to be modified. This study shows team learning is not significantly more effective than individual learning and benefits can be derived from individual learning. Although past researchers have conducted a variety of studies that support team learning, this study fails to support that grouping students or workers into teams is the best method in every case. Previous researchers viewed groups as bounded structures that developed from purposive interdependent actions of individuals (Allen & Hecht, 2004). Each member who joins a group has a unique background of past experiences and a personal history. Teams are guided and influenced by the group members' past experiences and the members' sense of future as they operate in time to accomplish the goals of the team (Allen & Hecht).

The following hypothesis were tested in this study:

> *Null Hypothesis H_{o1}: There is no statistically significant difference between the final test grades in students who work in teams and grades of students who work individually.*
>
> *Alternative Hypothesis H_{a1}: There is a statistically significant difference in final test grades between students who work in teams and grades of students who work individually.*

The results of this study support the Null Hypothesis H_{o1}: There is no statistically significant difference between the final test grades in students who work in teams and grades of students who work individually.

CONCLUSION

This study was focused on the learning outcomes in terms of grades. According to a study by Ravenscroft et al. (as cited in Kunkel & Shafer, 1997), more research is necessary on the effects of team learning and affective outcomes. The need for this study arose because of the popular trend toward the use of teaming techniques in business settings. At the university level, most professors still employ a traditional lecture format in which they verbally disseminate knowledge, and the students have little or no interaction with others during the presentation (Wells & Grabert, 2004). A teaming approach to learning has become more common during the 21st century. Organizations and universities have been placing a greater emphasis on teaming. Based on the findings of this study, the teaming method is not significantly more beneficial than the traditional lecture format.

RECOMMENDATIONS AND FUTURE RESEARCH

This study comparing team learning versus individual learning failed to show significance at the .05 level, $t\ (78) = .36$, $p = .73$. Students assigned to work in groups at in speech classes at the beginning of a semester showed no significant grade variance at the end of the semester from peers who were assigned to the individual process. This researcher recommends that further comparison studies be conducted in the area of team learning versus individual learning to determine which method is more effective in accomplishing learning goals at the postsecondary level and in the workplace. This researcher recommends that postsecondary institutions continue to use a combination of the two methods in preparing their students to succeed as future employees until more research is available. It is

recommended that future studies be conducted using a variety of participants to see whether outcomes differ in a significant manner.

Future related research on team effectiveness in the classroom environment may entail the use of different evaluation or assessment instruments or alternative teaching and learning techniques. In addition, the addition of team orientation sessions and supplemental information provided to teams for team processes, dynamics, and outcomes may affect team effectiveness results. Other recommendations may entail using teams in different subjects or sequential courses in the same subject.

The data from this study show there is still a need for researchers to add new knowledge to the existing body of research on the value of team versus individual academic achievements. There is a need for new studies in a variety of settings targeting different types of participants. This research might be followed by a study involving the success of team assignments in a workplace environment in real time using adult employees as participants. Another future study might compare the grades of a group of female participants with the grades of a group of male students to determine whether there is a significant difference in their academic success when they work in teams. The results might show that females earn higher grades when they work alone with males having better success when they work as a team, or the reverse could occur. A survey study could be designed for a group of postsecondary senior students in order to discover what they have learned about teaming strategies in their undergraduate programs. Another possible study could examine the success of teamwork combined with individual efforts in accomplishing a project.

These additional studies would add useful information to the existing body of knowledge in the area of teamwork as a method of accomplishing learning goals in schools and in the workplace. Researchers and educators may continue to consider team learning strategies in the coming years because of the importance of designing outstanding, relevant curricula and learning strategies for the students who will be instrumental in shaping the nation's future economic success.

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