A Comparison of Two Intervention Strategies on the Academic Performance of Student-Athletes

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ABSTRACT

The purpose of this study was to determine the effect of the Model Student Tutor Program (MSTP) when compared with the traditional study table on the academic performance of football players at the University of Wisconsin-LaCrosse as measured by grades acquired in selected courses.

Three hypotheses were developed. The first hypothesis stated that there will be no significant difference in the grades of football players based on the type of intervention for literature-based courses. The second hypothesis stated that there will be no significant difference in the grades of football players, based on the type of intervention for science-based courses. The third hypothesis stated that there will be no significant difference in the grades of football players based on the type of intervention used across course content.

Based on the results of an ANOVA, the first hypothesis was rejected while the second and third hypotheses were retained.

INTRODUCTION

The daily media have chronicled the problems of intercollegiate athletics; horror stories include drug abuse, gambling, illegal payments, corruption, rape, and violence. The primary driving force behind many of these problems surrounding intercollegiate athletics has become the fiscal rewards associated with winning (Cramer, 1986). As a result, college sports programs and college

athletes engage in what Walter, Smith, Hoey, Wilhelm, and Miller (1987) have called a mutually exploitive relationship.

While universities and their governing bodies have been slow to enact reform, recent NCAA and Congressional legislation has attempted to improve the academic integrity of intercollegiate athletics. The NCAA has employed Proposition 48, and Senator Bill Bradley (D-New Jersey) has proposed a bill before Congress requiring schools to report their graduation rates and make them available upon request to prospective athletes ("Bradley bill," September 18, 1989). A number of other strategies have also been suggested, including freshman ineligibility, institutional subsidization of the athletic program, revenue sharing, and numerous academic interventions. Many of these suggestions have merit, and their intent, improving the academic performance of student-athletes, must be hailed.

The traditional study table has been the most popular intervention strategy used to improve academic performance (Harney, Brigham, and Sanders, 1986). One of the reasons for its popularity is the ease with which it can be incorporated into a program with minimal cost or expertise. The intervention consists of required study sessions three to four times a week, each lasting two to three hours. Attendance is mandatory and unexcused absences have adverse consequences (Harney et al. 1986). This strategy has been most common at the Division I level, but little evidence exists as to the efficacy of this strategy (Harney et al. 1986).

The Model Study Tutor Program (MSTP) was developed by Campbell and Hollstein (1989) at the University of New Mexico to utilize the resources already available in their classes to help those students who were having difficulty. The program was first implemented with nutrition and chemistry students but then expanded to a variety of courses. The goal of the program was to provide peer tutors for "at risk" students with both tutors and tutorees coming from the same class. Tutors and tutorees were thus exposed to the same course lectures and materials. This strategy identified good students and poor "at-risk" students early in the semester. The good students were then paired with "at-risk" students and encouraged to study together. Tutor groups usually met twice weekly with study sessions lasting one and a half hours. Tutor groups were ideally one to two tutorees per tutor. Tutors would take attendance at each study session to make sure that tutorees were complying with the program requirements. Class attendance was monitored as well. Tutorees who did not regularly attend class or the tutor sessions were dropped from the program. Tutors could receive a 300-level readings or independent study credit for their involvement in the program. The MSTP had funds available to cover an additional credit fee if the tutor was required to pay that fee.

Funding for the program was provided by the University of New Mexico Foundation. This funding paid for the additional credit fees and an honors luncheon at the end of the semester.

Although teachers were asked to keep records of the program to assess efficacy, little research had been done to determine the effectiveness of the program. The format of the program coupled with its cost effectiveness has made the program attractive. With these thoughts in mind it was felt that the program had potential, was innovative, and should undergo formal assessment as to its effectiveness.

METHOD

Subjects

This study was concerned with the effect of the MSTP and the traditional study table on the grades of football players in selected classes. The subjects for this study consisted of eighty-one football players from a Division III program, the University of Wisconsin-La Crosse, in the fall semester of 1989. Participants registered in Biology 100 were randomly assigned to one of three groups: one group receiving peer tutoring, one group assigned to the traditional study table, and a control group. Participants registered in 100 level English and history were randomly assigned to one of three groups: one group receiving peer tutoring, one group assigned to the traditional study table, and a control group. Neither of the control groups received the academic intervention.

Research Design

This study was a post-test only control group experimental design in which pretest scores were not measured. The subjects were administered the treatment, and their performance was assessed and compared against a control which did not receive the treatment (Gay, 1987).

After determining the class schedules of the football players, student-athletes were randomly assigned to one of six groups. Thirty-six of the eighty-one student-athletes involved in the study were registered for Biology 100 and were randomly assigned to one of the following three groups: the treatment group participating in the MSTP, the treatment group participating in the traditional study table, and the control group. Forty-five of the eighty-one student-athletes involved in the study were registered for 100 level English and history and were randomly assigned to one of the following three groups: the treatment group participating in MSTP, the treatment group participating in the traditional study table, and the control group. No student-athlete was assigned to or participated in more than one group.

The MSTP participants met with the researcher early in the semester to receive information on how the program would be organized. Letters were given to the student-athletes to be delivered to their individual instructors, and a follow-up meeting was held with the teachers to explain the program and solicit their help. Four weeks were allowed to identify those students who were doing well (earning an A or B) and thus could be matched with student-athletes. Peer

tutors were solicited at this time, and a meeting of all tutors and tutorees was held to explain the program. Participants met twice weekly with each session lasting one and a half hours. Class attendance was mandatory and was monitored by both the tutor and the research coordinator in conjunction with individual professors. The entire group of tutors and tutorees met every two weeks to determine progress, class attendance, and help session attendance and to discuss any difficulties.

Students assigned to the traditional study table started sessions at the same time as the peer tutoring intervention began. This was done to keep total study time equal. It was determined that Tuesday and Thursday evenings were best for the subjects in terms of non-class evenings. Participants were required to work on their assigned course, either science-based or literature-based, during the study session. The study sessions were one and a half hours in length, which matched the amount of time spent each week in peer tutoring. Class attendance was mandatory for this group as well and was monitored by the study table supervisor in conjunction with individual professors.

Student-athlete subjects were dropped from the study for five reasons: (1) quitting school, (2) quitting the football team, (3) dropping the class to be assessed, (4) not having an ACT test on record, and (5) being uncooperative or unwilling to fulfill the requirements of the intervention including study session attendance and class attendance. Subjects were allowed three absences from study session attendance and three absences from class attendance.

The two control groups did not receive the manipulated variable, the learning intervention, but in all other aspects were similar to the experimental groups. Grade acquired in the particular class was the dependent variable and was determined at the end of the 1989 fall semester, making this a posttest-only control group design (Gay, 1987).

Statistical Method

The statistical method used to test the first and second hypotheses was a one-way analysis of variance (ANOVA) (Kennedy et al., and Bush, 1985). The independent variable for the first hypothesis was type of intervention applied to student-athletes in a literature-based course and had three levels (peer group, study table, and control). The independent variable for the second hypothesis was type of intervention applied to student-athletes in a science-based course and had three levels (peer group, study table, and control). The .05 level of significance was used to test for statistical differences. Post hoc Scheffes were performed on significant findings where appropriate.

The statistical method used to test the third hypothesis was a two-way ANOVA with post hoc procedures (Kennedy et al., 1985). The two independent variables were type of intervention and course content. The .05 level of significance was used to determine whether there was a statistical difference

experiment-wise, and a .05 level of significance was used to determine statistical differences for the family of pair-wise comparisons for simple main effects. The basic assumptions of ANOVA were tested before the analysis was made.

ACT composite scores were tested using a one-way ANOVA to determine any significant pre-disposing differences in groups that might call for the use of a different statistical analysis. ACT composite scores were tested across the independent variable intervention in a one-way analysis for both literature- and science-based courses. A two-way ANOVA was also used to test for differences in ACT composite scores across course content and intervention. The two independent variables were type of intervention and course content. The .05 level of significance was used to determine whether there was a statistical difference experiment-wise. A .05 level of significance was used to determine statistical differences for the family of pair-wise comparisons for simple main effects.

ACT English scores were also tested using a one-way ANOVA to determine any significant pre-disposing differences in groups that might call for the use of a different statistical approach. ACT English scores were tested across the independent variable intervention in a one-way analysis for a literature-based course.

ACT science scores were tested as well using a one-way ANOVA to determine any significant pre-disposing differences in groups that might call for the use of a different statistical approach. ACT science scores were tested across the independent variable intervention in a one-way analysis for a science-based course.

The data were entered into a Macintosh SE computer, and the statistical software Statview 512 was used.

RESULTS

ACT composite scores were tested using a one-way ANOVA to determine any significant pre-disposing differences across the independent variable intervention for the literature-based groups. The alpha level was set at .05. The range of scores was from 10 to 28 ($\underline{M}$ = 21.143, and $\underline{sd}$ = 4.498) (N = 21). The three means were not significantly different, $\underline{F}$ (2, 18) = 1.576, $\underline{p} > .05$.

ACT composite scores were tested using a one-way ANOVA to determine any significant pre-disposing differences across the independent variable intervention for the biology groups. The alpha level was set at .05. The range of scores was from 11 to 25 ($\underline{M}$ = 19.043, and $\underline{sd}$ = 3.937) (N = 23). The three means were not significantly different, $\underline{F}$ (2, 20) = 1.186, $\underline{p} > .05$.

A two-way ANOVA was used to test for differences among the scores across course content and intervention on the ACT composite scores of the subjects. The alpha level was set at .05 experiment-wise and .01 comparison-

wise for simple main effects. The range of scores was from 10 to 28 ($\underline{M}$ = 20.045, and $\underline{sd}$ = 4.297) (N = 44).

The interaction of intervention x course content was not significant, $\underline{F}$ (2, 38) = 2.797, $\underline{p}$, > .05.

The main effect of intervention was not significant, $\underline{F}$ (2,38) = .071, $\underline{p}$ > .05. The main effect of course content was not significant, $\underline{F}$ (1,38) = 3.182, $\underline{p}$ > .05.

A one-way ANOVA was used to test for differences in the mean ACT English scores of the groups receiving the three different interventions and being measured for performance in the literature class. The alpha level was set at .05. The range of scores was from 8 to 24 ($\underline{M}$ = 18.143, $\underline{sd}$ = 4.175) (N = 21). The three groups were not significantly different on the ACT English score, $\underline{F}$ (2, 18) = 3.435, $\underline{p}$ > .05.

A one-way ANOVA was used to test for differences in the mean ACT science scores of the groups receiving the three different interventions and being measured for performance in the biology class. The alpha level was set at .05. The range of scores was from 12 to 30 ($\underline{M}$ = 21.391, $\underline{sd}$ = 5.203) (N = 23). The three groups were not significantly different on the ACT science score, $\underline{F}$ (2, 20) = 3.414, $\underline{p}$ > ,.05.

As a result of these findings it was determined that the literature intervention groups were very similar to one another in terms of ability in this area of study. This also appears to be the case for the biology groups. Thus, ANOVA was used to investigate the intervention effects.

Statistical Analysis of Grades

The first hypothesis tested states:

H:$_{01}$ There will be no significant difference in the grades of football players based on the type of intervention for literature based courses.

A one-way ANOVA was used to test for differences in the mean grades of the groups receiving the three different interventions and being measured for performance in the literature class. The alpha level was set at .05. The range of scores was from 0 to 4 ($\underline{M}$ = 2.333, $\underline{sd}$ = 1.155) (N = 21). The three groups were significantly different on the grades acquired in literature courses, $\underline{F}$ (2, 20) = 4.333, $\underline{p}$ < .05. (See Tables 1-4.) As a result of these findings, H_{01} was rejected.

Post hoc Scheffes were performed to determine statistical differences for the family of pair-wise comparisons. For the comparison of peer versus study table, a non-significant Scheffe of .036 was obtained. For the comparison of control versus peer, a non-significant Scheffe of 2.893 was obtained. The comparison of control versus study table yielded a significant Scheffe of 3.571, $\underline{p}$ < .05.

Table 1
Course Grades for Literature Groups

Mean	Std. Dev.	Std. Error	Variance	Coef. Var.	Count
2.333	1.155	.252	1.333	49.487	21

Minimum	Maximum	Range	Sum	Sum Sq	# Missing
0	4	4	49	141	0

Table 2
Cell Course Grades for Literature Groups

Group	Count	Mean	Std. Dev.	Std. Error
Peer	7	2.714	1.113	.421
Study Table	7	2.857	.690	.261
Control	7	1.429	1.134	.429

Table 3
ANOVA Table Course Grades for Literature Groups

Source	df	Sum Squares	Mean Square	F-test
Between groups	2	8.667	4.333	4.333*
Within groups	18	18.000	1	p = .0291
Total	20	26.667		

*Significant at 5%.

Table 4
Comparison of Course Grades for Literature Groups

Comparison	Mean Diff	Scheffe F-test
Peer vs. Study Table	-.143	.036
Control vs. Peer	1.286	2.893
Control vs. Study Table	1.429	3.571*

*Significant at 5%.

The second hypothesis tested states:

H:$_{02}$ There will be no significant difference in the grades of football players based on the type of intervention for science based courses.

A one-way ANOVA was used to test for differences in the mean grades of the groups receiving the three different interventions and being measured for performance in the biology 100 class. The alpha level was set at .05. The range of scores was from 0 to 3 (M = 1.522, sd = .947) (N = 23). The three groups were not significantly different, F (2, 20) = .045, p > .05. (See Tables 5-7.) As a result of these findings, H:$_{02}$ was retained.

Table 5
Course Grades for Biology Groups

Mean	Std. Dev.	Std. Error	Variance	Coef. Var.	Count
1.522	.947	.198	.897	62.246	23

Minimum	Maximum	Range	Sum	Sum Sq	# Missing
0	3	3	35	73	0

Table 6
Cell Course Grades for Biology Groups

Group	Count	Mean	Std. Dev.	Std. Error
Peer	7	1.571	.976	3.69
Study Table	7	1.429	.787	.297
Control	9	1.556	1.130	.377

Table 7
ANOVA Table Course Grades for Biology Group

Source	df	Sum Squares	Mean Square	F-test
Between groups	2	.088	.044	.045
Within groups	20	19.651	.983	p = .9561
Total	22	19.739		

The third hypothesis tested states:

H:$_{03}$ There will be no significant difference in the grades of football players based on the type of intervention used across course content.

A two-way ANOVA was used to test for differences among the scores across course content and intervention on the grades of student-athletes during the season. The alpha level was set at .05 experiment-wise and .05 for the family of pair-wise comparisons for simple main effects. The range of scores was from 0 to 4 (M = 1.909, and sd = 1.117) (N = 44).

The interaction of intervention x course content was not significant, F (2, 38) = 2.61, p > .05.

The main effect of intervention x course content was not significant, F (2, 38) = 2.154, p > .05. The main effect of course content was significant, F (1, 38) = 7.306, p < .05. (See Tables 8-10.) As a result of these findings, H:$_{03}$ was retained.

Table 8
Course Grades

Mean	Std. Dev.	Std. Error	Variance	Coef. Var.	Count
1.909	1.117	.168	1.247	58.502	44

Minimum	Maximum	Range	Sum	Sum Sq	# Missing
0	4	4	84	214	0

Table 9
Incidence Table for Course Grades

	Literature	Science	Totals
Peer	7 2.714	7 1.571	14 2.143
Study Table	7 2.857	7 1.429	14 2.143
Control	7 1.429	7 1.556	16 1.500
Totals	21 2.333	23 1.522	44 1.909

Table 10
ANOVA Table Course Grades

Source	df	Sum Squares	Mean Square	F-test	P value
Intervention (A)	2	4.269	2.135	2.154	.1299
Course Content (B)	1	7.239	7.239	7.306*	.0102
AB	2	5.172	2.586	2.610	.0867
Error	38	37.651	.991		

*Significant at 5%.

DISCUSSION

Evaluation of the Hypotheses

As a result of this study, the first null hypothesis (H:01)--that there will be no significant difference in the grades of football players based on the type of intervention for a literature-based course--was rejected. There was a significant difference between the study table and control group for literature courses. It may be that the structured discipline of a set study time monitored by someone in a position of authority is conducive to this type of course. Peer tutoring appeared to be effective in helping the performance of football players in literature classes but to a lesser degree. These results may have occurred as a result of better peer tutors in literature as compared to the peer tutors in science. It might also be that the concepts in science were too difficult to be successfully communicated through the use of peer tutoring.

Neither peer tutoring nor study table was significantly effective in improving the performance of football players in science-based classes; therefore H:02 was retained. A possible explanation could be the moderately late application of the interventions (during the fifth week) to a course in which the early understanding of material is a critical building block to later performance.

When comparing the type of intervention across course content, no significance was found; therefore H:03 was retained. As a result, it could not be shown that study table or peer tutoring would be more effective if one had to choose between interventions regardless of course content.

It was encouraging to find that both interventions experienced success in improving the grades of the literature subjects. This would indicate that either approach is worthy of strong consideration when implementing an academic improvement program targeted for this type of course content.

The positive response to both interventions for literature might be a result of the difference in subject area. The means for all three groups in science-based classes were considerably lower. As might be expected, the mean of all science grades was significantly lower than the mean of all literature grades. The difference in the grades by subject area might account for some of the results obtained.

Evaluation of the Late Start

One inherent weakness of the MSTP is the time needed to identify the good and poor students in each class. The MSTP calls for good students to be identified before they can be matched with "at-risk" student-athletes. In the time necessary for the first evaluation, much of the foundation for success in the particular class has been established. As an example, a number of the study skills suggested in Claude Olney's "Where There's A Will There's An A" (1988) need to take place before the class even starts or very early in the semester. Consequently, one of the main reasons for the inability to find significance with

this intervention may be the late application of the program due to the necessary identification of good students who will be the peer tutors. While the traditional study table does not require this time lapse before application, it was felt that in order to keep the two interventions equal in total study time, subjects receiving the traditional study table should not start until the fifth week of the semester. Even with this late start, the study was able to find significantly higher grades for student-athletes in a study table setting for literature courses. The late start may well have been the reason for the lack of positive findings for the study table in the science-based class. It should be noted that the late start is not an inherent weakness of the traditional study table as an intervention strategy.

Evaluation of the Attendance Requirement

The question of mortality must be raised when looking at the number of subjects at the beginning of the study (N = 81) and the ending number of participating subjects (N = 44). While dropping subjects from the study for quitting school, quitting football, dropping the class to be assessed, or lacking an ACT score was out of the control of the investigator, the fifth consideration--being unwilling to fulfill the requirements of the intervention--must be addressed.

One factor that may influence attendance is the number of days in the week that subjects are required to be present. It may be that the fewer number of days in the week that student-athletes are expected to attend, the greater the chances are for increased attendance. The more study sessions required per week. the poorer the cooperation. The question then becomes a matter of choosing the optimum number of study sessions both in terms of attendance and total potential study time; this study required two study sessions per week. The optimum number of study sessions per week has yet to be determined both from the perspective of attendance and total study time. The same could be said for the amount of time spent in each study session. While this study chose a one and a half hour study session, total study time (i.e., the magnitude of the treatment) may have been partially responsible for the lack of significantly positive results.

Attempts have been made to examine the problem for academic performance across all college divisions regardless of any differences that exist. However, there can be no question that, in terms of negative incentives, major college and scholarship schools possess a strong motivator in terms of study session attendance, that being the athletic scholarship awarded to the student-athlete. Athletic scholarships can be pulled for specific reasons: one of these might be poor attendance at study sessions. This, however, cannot be done at the Division III level and thus could not be applied to the study in question.

The magnitude of the treatment could also be increased through the introduction of a study skills program in conjunction with either the MSTP or study table intervention. The University of Missouri has gone so far as to implement the Total Person Program (Gregorian, 1989) instituted by health education professor Parris Watts. The goal of this program is to prepare student-

athletes for a total life experience through the development of the intellectual, physical, emotional, social, and spiritual aspects of life. Because the program emphasis was centered as much on post-graduation as on graduation, the goals of the program, by Watts' own admission, may have been too high. More recently the program's emphasis has shifted to the more tangible areas of study skill improvement and strategies to increase graduation rates.

While Division III schools may not have the resources to implement such an involved program, they might consider a short study skills improvement program similar to the Claude Olney "Where There's A Will There's An A" video tape program in conjunction with a study table.

Evaluation of the Program's Flexibility

Another possible explanation for the lack of effect of the MSTP intervention may be the reliability of self-reporting regarding the quality and quantity of the study sessions. While many of the subjects were cooperative regarding the requirements of the intervention, for some it became their perception that the sessions would do them little good. Those who did not follow the requirements of the intervention were dropped from the study. The advantages of flexibility and freedom to choose the desired time and place to study was hoped to encourage greater compliance. However, this may not have been an entirely correct assumption. Consequently, this intervention may be better suited to students with a higher level of motivation. While many student-athletes are motivated to perform in the classroom, for others the regimentation and discipline offered through a closely monitored study table may be the best approach.

Some educators may find this "hand holding" distasteful. Still others may feel that in so doing we do nothing to encourage individuality, responsibility, and the development of initiative, all of which are skills needed to be successful once student-athletes are done with college and face mainstream society. Harney (1986) suggested that while it should be sufficient to inform students of such key behaviors as getting to class, doing homework, and taking tests, the evidence is clear that this is not the case. Some educators feel that student-athletes may respond better to discipline based on their experience in organized sport (Sparent, 1988). The application of this same discipline, through the use of a monitored study table, may be the most effective means at our disposal for improving the academic performance of student-athletes.

Evaluation of the Number of Subjects

Finally, the lack of significance for each of the interventions might be accounted for by the low number of subjects. This was in part a result of efforts to control for confounding variables by limiting the course content to specific courses and thus keeping differences in courses and professors to a minimum. The study was conducted during the fall semester when student-athletes were in

their competitive season. In so doing, in-season versus out-of-season performance considerations did not have to be taken into account.

Summary

This study attempted to examine and improve the academic performance of student-athletes regardless of college division. While it has been pointed out that one important difference cannot be overlooked, that being the athletic scholarship and its built-in motivation, in most aspects student-athletes across divisions do not differ greatly. The most obvious similarity that the scholarship student-athlete and the non-scholarship student-athlete share is the extreme time demands placed on them during the season as well as the off-season. From practice time, coaches' meetings, and physical therapy treatments to travel, weight training and film sessions, little time is left over for classes and study time. Each special interest group vies for the student-athletes' time, including head coaches, position coaches, athletic trainers, weight coaches, and academic support staff.

Recently the administrative strategy for improving the academic performance of student-athletes has taken the form of Proposition 48. The central theme of this legislation focuses on limiting enrollment to a higher quality student. This strategy has initiated heated debate as to the potential for discrimination. Walter, et. al., (1987) suggested that educators and administrators in search of alternative strategies may find more success by "focusing on the educational process as it occurs on the college campus." Future research aimed at this educational process will hopefully have a strong impact on the academic performance of student-athletes and do much to improve intercollegiate athletic credibility in our society.

CONCLUSIONS

Within the limitations of the single institution studied and the focus on football student-athletes only, the following conclusions appear justified:

1. The performance of student-athletes in literature-based classes was helped by both the study table and the MSTP interventions.
2. The performance of student-athletes in science-based classes was not helped by either the study table or the MSTP interventions.
3. It could not be shown that study table or peer tutoring would be more effective if one had to choose between interventions regardless of course content.
4. The intervention to be used should be determined based on the course content to be improved.

RECOMMENDATIONS

While the results of this study did not produce conclusive positive results as to the efficacy of both interventions for the two disciplines, a number of considerations have been developed for future research as institutions pursue better academic performance from their student-athletes.

Programmatic Recommendations

The study in question might be strengthened through the following recommendations:

1. The determination of the optimum total study time per session and optimum days per week.
2. The inclusion of a study skills program in conjunction with the study sessions.
3. The inclusion of peer tutoring within a study session environment where regular attendance can be checked and validated.
4. The early determination of good students (through the use of ACT tests or some previous performance) to facilitate the early start of the intervention.
5. The use of grade point averages as the dependent variable, thereby increasing the number of subjects.

Recommendations for Further Study

Future research within this topic area might examine the following:

1. Replication of this study at other Division III and Division I schools.
2. Replications of this study with other sports, especially for those sports whose student-athletes have a traditionally poor academic performance.
3. Replication of this study with female student-athletes.
4. A description of the different academic performance programs being offered throughout the country and an investigation of their effectiveness in improving grade point averages and graduation rates.
5. A description of the budget and personnel directly related to student-athlete academic performance programs.
6. Further examination of the impact of Proposition 48 on academic performance and graduation rate data.
7. The investigation of other interventions that might be more effective in improving science grades.

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