DOES PARTICIPATION IN ENRICHMENT ACTIVITIES AFFECT OVERALL PERFORMANCE OF ELEMENTARY AND MIDDLE SCHOOL STUDENTS?: AN EVALUATION OF THE RELATIONSHIP BETWEEN TCNJ BONNER CENTER AND HEDGEPETH-WILLIAMS K-8 SCHOOL

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SUMMARY

The purpose of this evaluation is to determine if Hedgepeth-Williams students' participation versus non-participation in enrichment activities (notably the Academic Sports Academy afterschool program, or ASA) affect the students' academic outcomes, and if the number of times a student participates in enrichment activities leads to a better outcomes. Based on records of participation in enrichment activities collected by the Bonner Center for Community Engagement (BCCE) and on grade reports, this study finds statistically significant higher science grades for students who participated in enrichment activities when compared to those who did not, and that more participation produced higher science grades in a linear fashion. There is some evidence to suggest that grades in language arts were also improved, but the data is much less conclusive. We were unable to find any significant differences for participants and non-participants in terms of overall grades, math grades, social studies grades, or technology grades; we also found no difference in reported absences and tardies. Nonetheless, significantly higher science grades denote an unequivocal and positive effect of participation in enrichment activities, which is particularly compelling given the low quality of data available (and thus the exclusion of many potential cases). Better record-keeping of participation in enrichment activities would greatly facilitate future evaluation efforts and is likely to demonstrate a stronger positive impact.

METHODS

Hedgepeth-Williams students participated in a wide range of activities sponsored and organized by the BCCE; these were recorded by compiling ASA attendance records, ASA registration rosters, other rosters, and student project artifacts (e.g., poems, essays, and artwork) from all known activities provided by the BCCE in paper and electronic archives. Student participation was then paired with the only complete Hedgepeth-Williams roster that was available to the researchers, from 2010-2011. Student names were then replaced by

numbers and matched to grade reports from 2011-12. Because of the date of the grade reports, no data from Hedgepeth-Williams students or alumni who were currently in 8th or higher grades were included in the final analysis, regardless of their previous participation in ASA or other enrichment activities.

Subject grades represent arithmetic mean of four quarters of grades on a 100-point scale. The 100-point scale reflects either the original numeric scores assigned by Hedgepeth-Williams teachers, or a conversion of letter grades with the following scale: A+ = 97, A = 94, A- = 90, B+ = 87, B = 84, B- = 80, C+ = 77, C = 74, C- = 70, D+ = 67, D = 64, D- = 60, F, F- = 55. Letter grades of I, N, NI, O, S, and U were treated as missing data.

One measure of academic outcomes involves absences and tardies. The number of absences and tardies for each student was recorded as part of the grade report. These were unchanged in the analysis.

Other dependent variables examined include the average overall grades (TOTAVEN), language arts grades (LITAVEN), math grades (MATAVEN), science grades (SCIAVEN), social studies grades (SOCAVEN), and technology grades (TECHAVEN) of the students at Hedgepeth-Williams. The dependent variables are all represented as numerical variables ranging from 0 to 100. The average overall grades (TOTAVEN) is an average of the five original variables, average language arts grades (LITAVEN), average math grades (MATAVEN), average science grades (SCIAVEN), average social studies grades (SOCAVEN), and average technology grades (TECHAVEN). The means and standard deviations of the dependent variables are shown in Appendix 1. The distribution of the average overall grades (TOTAVEN) are shown in Appendix 2. The distribution of the average science grades (SCIAVEN) are shown in Appendix 3.

The first independent variable is whether or not a student definitely participated in enrichment activities (TOTDBIN). The variable was coded so that students who had participated in enrichment activities were coded as 1, and students who had not participated in enrichment activities were coded as 0. The frequency distribution of definite participation versus non-participation in enrichment activities is shown in Appendix 4.

The second independent variable is whether or not a student is suspected of participating in enrichment activities (TOTMBIN). Students who were matched based on incomplete names were included in this measure as participating. The variable was coded so that students who may have participated in ASA or TCNJ activities were coded as 1, and students who had not participated in ASA or TCNJ activities were coded as 0. The frequency distribution of suspected participation versus non-participation in enrichment activities is shown in Appendix 5.

The third independent variable is the number of times the students definitely participated in enrichment activities (TOTDEF). This variable is a

numerical variable ranging from 0 to 8. Students who participated in 6 or more activities were recoded into one category because there were very few students in this category. The frequency of participation in enrichment activities is shown in Appendix 6.

The fourth independent variable is the number of times it is suspected the students participated in enrichment activities (TOTMAYBE). Students who were matched based on incomplete names were included in this measure as participating. This variable is also a numerical variable ranging from 0 to 8. Students who participated in 6 or more activities were recoded into one category because there were very few students in this category. The frequency off participation in enrichment activities is shown in Appendix 7.

FINDINGS

Students that participated in enrichment activities had higher average science grades than students that did not. **There is a statistically significant relationship between average science grades (SCIAVEN), and whether students participated in enrichment activities or did not participate in enrichment activities (TOTDBIN, F=10.395, p=.001, and TOTMBIN, F=6.492, p=.011).** The average science grades based on definite participation versus non-participation are shown in Appendix 8. The average science grades based on suspected participation versus non-participation are shown in Appendix 9.

Whether students participated in enrichment activities or did not participate in enrichment activities and their average overall grades (TOTAVEN) was not statistically significant, regardless of whether TOTDBIN (F=.357, p=.551) or TOTMBIN (F=.626, p=.430) was used for whether or not the students participated in enrichment activities.

There was not a statistically significant relationship between average language arts grades (LITAVEN, F=.525, p=.470), average math grades (MATAVEN, F=1.278, p=.259), average social studies grades (SOCAVEN, F=.341, p=.560), average technology grades (TECHAVEN, F=.497, p=.482), and whether students definitely participated or did not participate in enrichment activities (TOTDBIN). Furthermore, there was not a statistically significant relationship between average language arts grades (LITAVEN, F=1.117, p=.292), average math grades (MATAVEN, F=.195, p=.275), average social studies grades (SOCAVEN, F=.159, p=.690), average technology grades (TECHAVEN, F=.654, p=.420), and whether students are suspected of participating or not participating in enrichment activities (TOTMBIN).

The more students participated in enrichment activities, the higher average science grades they had. **There was a statistically significant relationship between average science grades (SCIAVEN) and the number of times**

students participated in enrichment activities (TOTDEF, F=3.572, p=.002, and TOTMAYBE, F=3.557, p=.002). The average science grades based on frequency of definite participation are shown in Appendix 10. The average science grades based on frequency of suspected participation are shown in Appendix 11.

There is not a clear positive linear relationship between average language arts grades (LITAVEN) and the number of times we suspect students participated (TOTMAYBE), but it seems there is some improvement amongst students who participated in enrichment activities. There was a statistically significant relationship between average language arts grades (LITAVEN) and the number of times students participated in enrichment activities, but only when students we suspect participated were included (TOTMAYBE, F=3.020, p=.007). The average language arts grades based on frequency of suspected participation are shown in Appendix 12.

The number of times Trenton elementary and middle school students participated in enrichment activities and their average overall grades (TOTAVEN) was not statistically significant, regardless of whether only the students we know for certain participated in the activities were included (TOTDEF, F=1.052, p=.395) or whether all the students we suspect participated in the enrichment activities a number of times based on an incomplete name were included also (TOTMAYBE, F=1.399, p=.221).

There was not a statistically significant relationship between average language arts grades (LITAVEN, F=1.547, p=.163) average math grades (MATAVEN, F=1.293, p=.261), average social studies grades (SOCAVEN, F=1.652, p=.133), and average technology grades (TECHAVEN, F=1.134, p=.347), and the number of times students definitely participated in enrichment activities (TOTDEF). Furthermore, there was not a statistically significant relationship between average math grades (MATAVEN, F=.518, p=.794), average social studies grades (SOCAVEN, F=1.342, p=.239), and average technology grades (TECHAVEN, F=1.422, p=.212), and the number of times students are suspected of participating in enrichment activities (TOTMAYBE).

Participation and suspected participation was also compared to the number of absences and tardies recorded on grade records. There were no significant relationships between participation or suspected participation and number of absences or tardies.

DISCUSSION

Trenton elementary and middle school students who participated in enrichment activities had statistically higher average science grades than students who did not, and greater participation in enrichment activities lead to statistically higher average science grades. However, it is difficult to conclude if there is a clear relationship between participation in the enrichment activities

and average language arts grades of the students at the Trenton elementary and middle school because there was a statistically significant relationship only when we included students we suspect participated in enrichment activities, but are not certain. The findings suggest that there is no statistical difference in average overall grades between students who participated in enrichment activities versus students who did not participate in enrichment activities. Additionally, there is no statistical difference in average overall grades among students who participated in more enrichment activities.

Further research should control for variables such as grade level, and classroom teacher to see if there are different results on average grades depending on the student's grade level and classroom teacher. Research such as interviewing teachers that work with the students in order to be able to gain insight on other impacts of the enrichment activities such as increased participation levels and changes in behavior of students would be valuable.

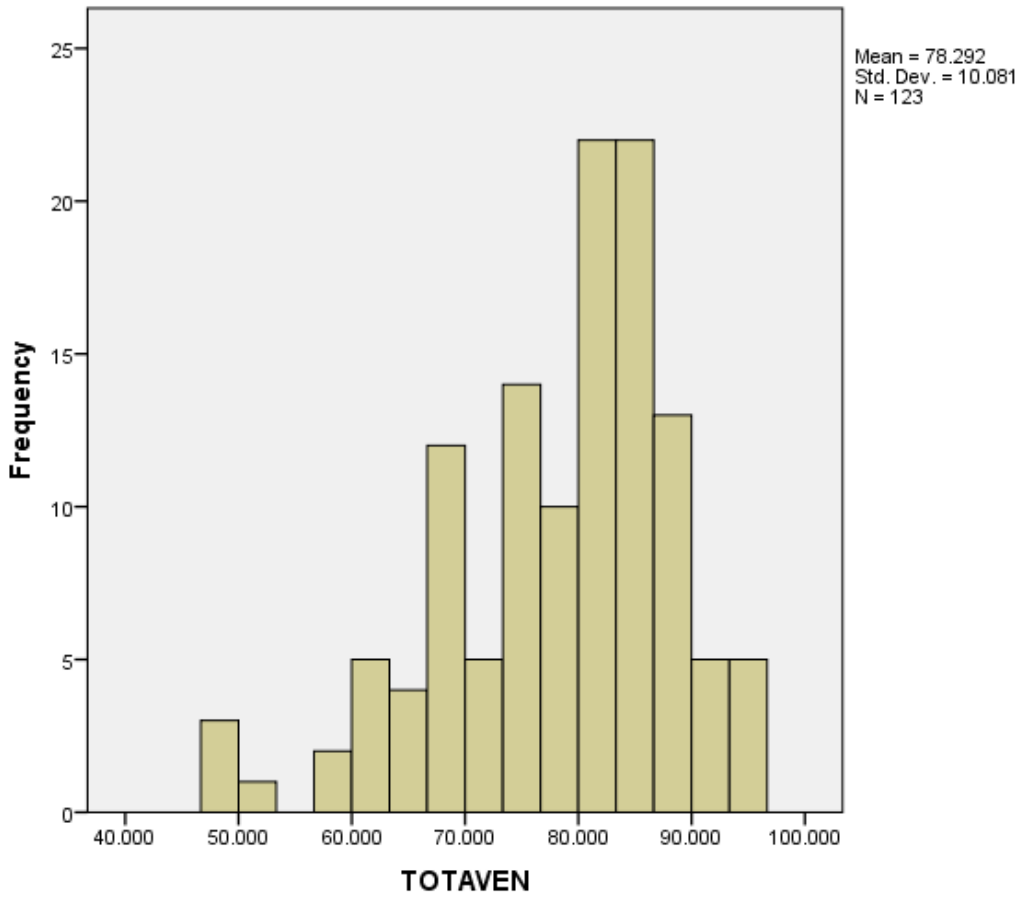
Another proposal for future research involves comparing HSPA scores of 11^{th} grade students who had participated in enrichment activities and students who had not participated in enrichment activities in elementary and middle school; this was not possible in this study because of missing data. Further research should also consider a longitudinal study, to see if participation in enrichment activities in elementary and middle school has an impact on students in high school.

All future evaluation would be improved by better record-keeping for enrichment activities and by securing complete student rosters for each grade from the elementary school for each year. Storing such data in a single spreadsheet would greatly facilitate evaluation, although this would still need to be merged manually with grade reports and/or HSPA scores.

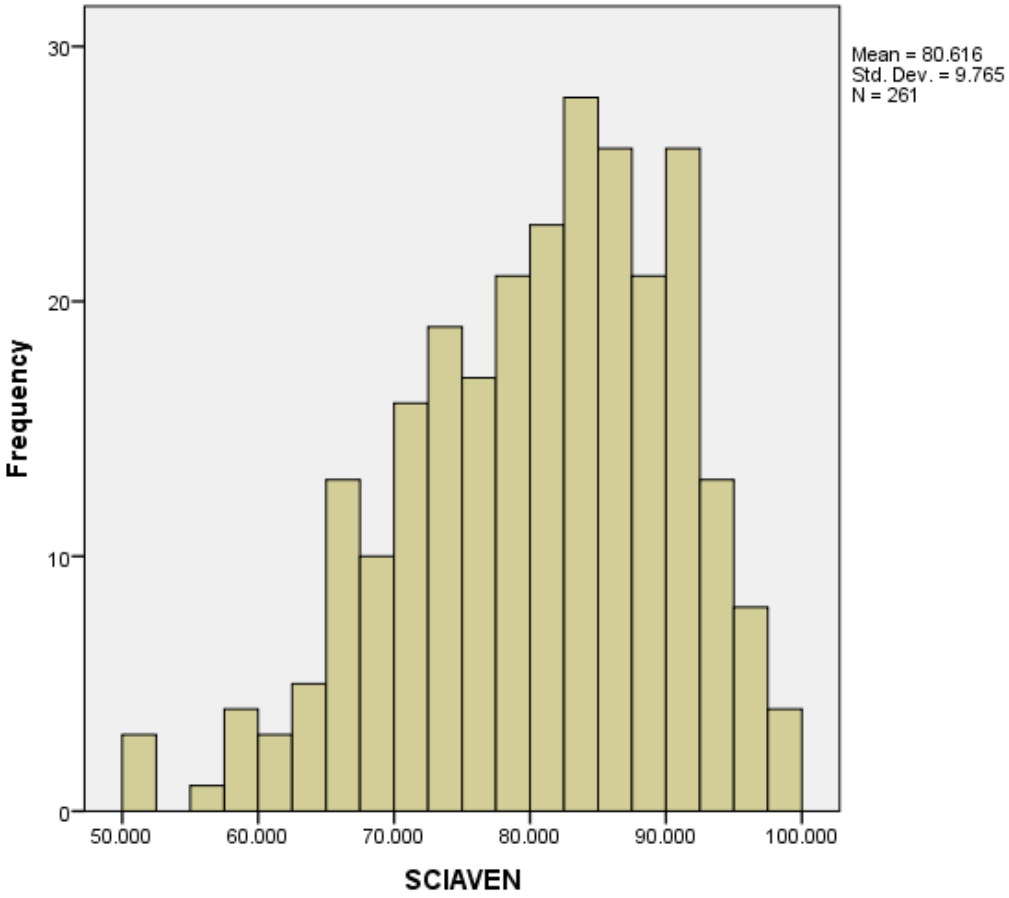
APPENDIX 1: MEAN AND STANDARD DEVIATION OF DEPENDENT VARIABLES

DEPENDENT VARIABLES	MEAN	STANDARD DEVIATION
LANGUAGE ARTS GRADES	76.540	11.105
MATH GRADES	79.041	10.207
SCIENCE GRADES	80.616	9.765
SOCIAL STUDIES GRADES	77.577	11.629
TECHNOLOGY GRADES	76.320	17.719
AVERAGE OVERALL GRADES	78.292	10.081

APPENDIX 2: DISTRIBUTION AVERAGE OVERALL GRADES



APPENDIX 3: DISTRIBUTION OF AVERAGE SCIENCE GRADES



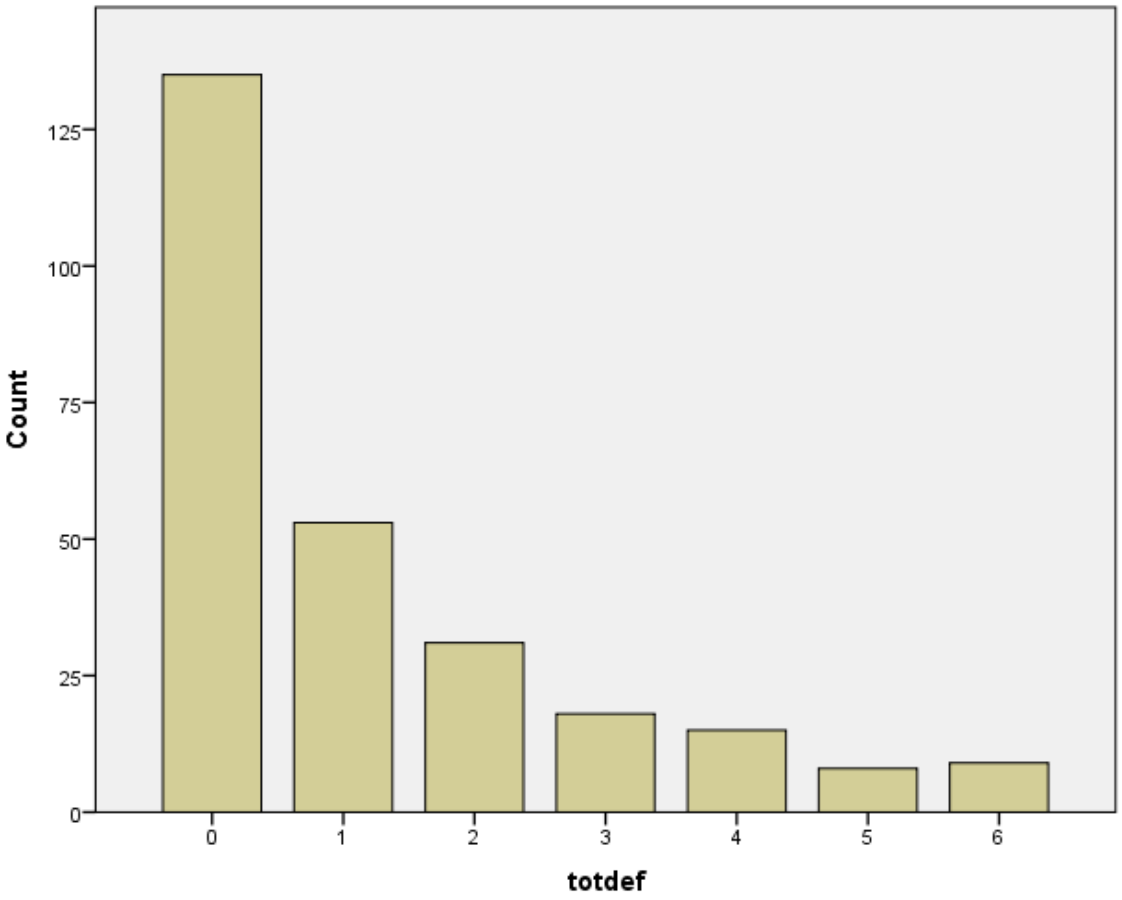
APPENDIX 4: FREQUENCY DISTRIBUTION OF DEFINITE PARTICIPATION VERSUS NON-PARTICIPATION IN ENRICHMENT ACTIVITIES

VALUE	FREQUENCY	VALID PERCENT
PARTICIPATED	134	49.8%
DID NOT PARTICIPATE	135	50.2%
TOTAL	269	100.0%

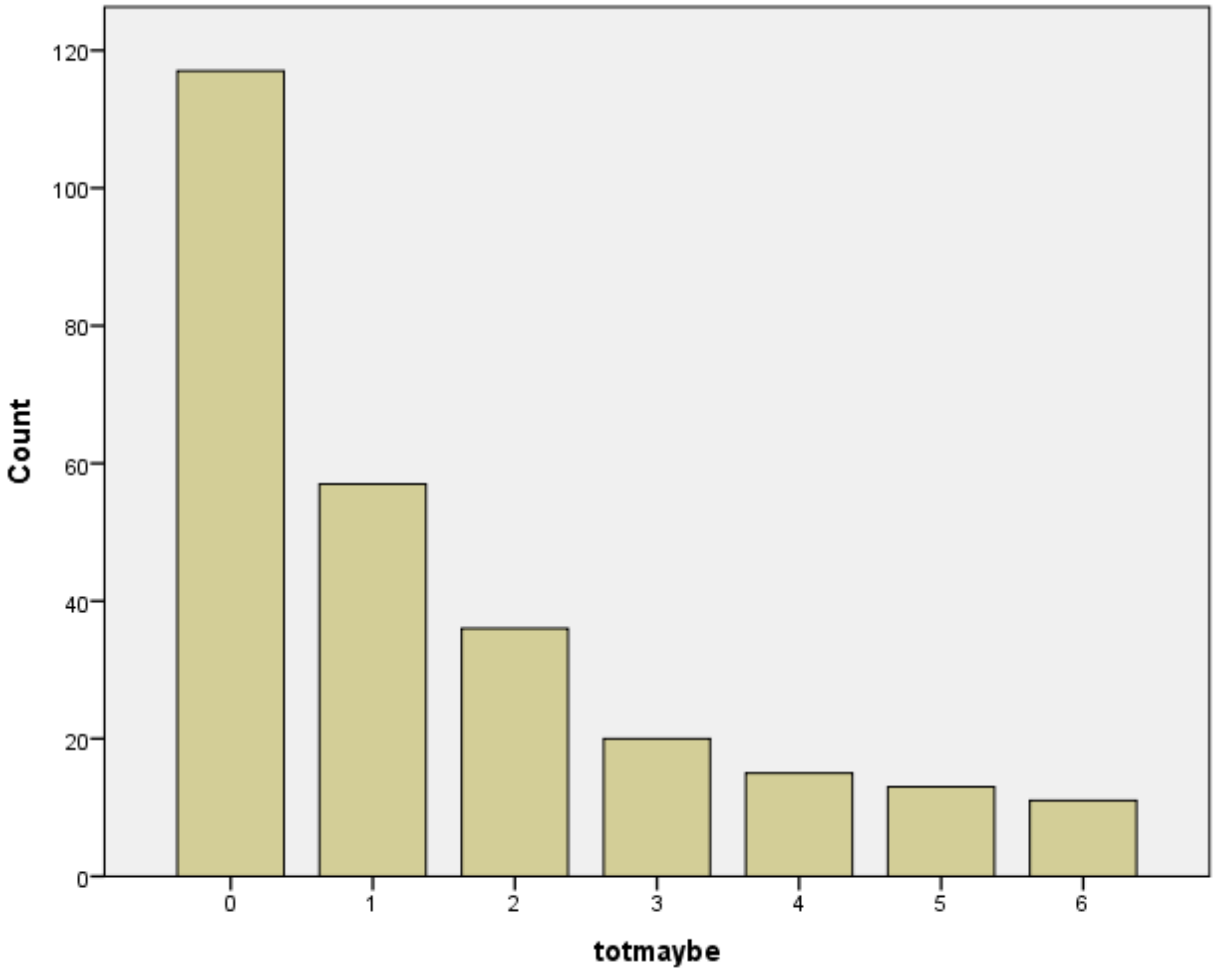
APPENDIX 5: FREQUENCY DISTRIBUTION OF SUSPECTED PARTICIPATION VERSUS NON-PARTICIPATION IN ENRICHMENT ACTIVITIES

VALUE	FREQUENCY	VALID PERCENT
PARTICIPATED	152	56.5%
DID NOT PARTICIPATE	117	43.5%
TOTAL	269	100.0%

APPENDIX 6: DEFINITE STUDENTS FREQUENCY OF PARTICIPATION IN ENRICHMENT ACTIVITIES



APPENDIX 7: DEFINITE STUDENTS AND SUSPECTED STUDENTS FREQUENCY OF PARTICIPATION IN ENRICHMENT ACTIVITIES



APPENDIX 8: AVERAGE SCIENCE GRADES BASED ON DEFINITE PARTICIPATION VERSUS NON-PARTICIPATION

PARTICIPATION	NUMBER OF STUDENTS	MEAN
0	128	78.664
1	133	82.494
TOTAL	261	80.616

APPENDIX 9: AVERAGE SCIENCE GRADES BASED ON SUSPECTED PARTICIPATION VERSUS NON-PARTICIPATION

PARTICIPATION	NUMBER OF STUDENTS	MEAN
0	111	78.844
1	150	81.927
TOTAL	261	80.616

APPENDIX 10: AVERAGE SCIENCE GRADES BASED ON FREQUENCY OF DEFINITE PARTICIPATION

NUMBER OF TIMES STUDENT PARTICIPATED	NUMBER OF STUDENTS	MEAN
0	128	78.664
1	52	80.140
2	31	82.984
3	18	82.134
4	15	83.000
5	8	87.938
6 or more	9	89.435
TOTAL	261	80.616

APPENDIX 11: AVERAGE SCIENCE GRADES BASED ON FREQUENCY OF SUSPECTED PARTICIPATION

NUMBER OF TIMES STUDENT PARTICIPATED	NUMBER OF STUDENTS	MEAN
0	110	78.844
1	55	79.817
2	36	81.178
3	20	84.988
4	15	78.883
5	13	85.942
6 or more	11	88.765
TOTAL	262	80.616

APPENDIX 12: AVERAGE LANGUAGE ARTS GRADES BASED ON FREQUENCY OF SUSPECTED PARTICIPATION

NUMBER OF TIMES STUDENT PARTICIPATED	NUMBER OF STUDENTS	MEAN
0	110	75.691
1	54	77.859
2	36	78.144
3	20	76.704
4	15	66.950
5	13	81.904
6 or more	13	79.780
TOTAL	259	76.540