

Relationship between Peer Group Influence and Students' Academic Achievement in Chemistry at Secondary School Level

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Abstract The research was designed to examine the relationship between peer group influence and academic achievement of secondary school chemistry students in some selected secondary schools in Jalingo metropolis of Taraba State. The study employed a survey- Causal-comparative research design in line with its appropriateness to the research problem. A sample of 120 students comprising of equal number of male and female students were selected randomly from three secondary schools. A 15-item questionnaire Peer Group Influence Assessment Questionnaire and Chemistry Achievement Test containing 50-items was administered to the students. The data were analyzed using means, standard deviation in answering the research questions and t-test and Person Product Moment Correlation were used in testing the hypotheses. The result from the study showed that; there is significant difference between students that belong to peer group and those that do not belong to peer group on the academic achievement of chemistry; there was no significant difference between the academic achievement of male and female chemistry students that are involved in peer group; and there is a positive and significant relationship between peer group influence and academic achievement of students in chemistry. It was therefore recommended that; school authorities/teachers should pay attention towards encouraging peer group activities in schools especially in the area of group discussion.

Keywords: *peer group influence, academic achievement, secondary school level, chemistry students, adolescents*

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1. Introduction

Understanding the nature, magnitude, significance and implication of peer group influence in education, is very crucial and important for the "productivity" of educational processes, and the organizational design of school systems in our Nigerian Educational sectors and around the globe. Peer group is an important influence throughout one's life but they are more critical during the developmental years of childhood and adolescence. The Oxford Advanced Learners Dictionary [13] defined peer group as a group of people of same age or social status. The peer group is the first social group outside the home in which the child attempts to gain acceptance and recognition. Adolescents always emulate their mates in whatever form of behavior they exhibit, particularly that which interest them thus, since socialization only refers to changes in behavior, attitudes having their origin in interaction with other persons and those which occur through interaction, a child learn more through interaction with peers. The school which is an established academic institution in which the behavior of an individual is sharpened to get him/her equipped for occupation socialization. In the school system the child gets into

the social group of "like minds" and interest. As a result of the various attitudes, skills, knowledge is acquired through role-play. Peer group as an agent of socialization is the most important socializing agent for the adolescent child.

Peer group is the pivot of social change and during interaction with peers, the child's life is transformed from the helpless child into matured adult. According to Castrogiovanni [4], a peer group is defined as a small group of similarly aged, fairly close friends, sharing the same activities. In general, peer groups or cliques have two to twelve members, with an average of five or six. Peer groups as cited in the works of Bankole and Ogunsakin [2] provide a sense of security and they help adolescent ask questions relating to social identity theory such as "who am I" and "what do I want out of life"? Given that adolescents spend twice as much time with peers as with parents or other adult, it is important to study the influence of peer group influence on chemistry students' academic achievement in secondary schools. Many peer groups can exert a positive influence on their friend. It is thought that intelligent students do help their peers bring up their academic performance. Likewise, girls with good friends who are considered intelligent tend to do better in school; all attributable to the fact that they share a common team of similar aspiration [9].

The term adolescence is derived from Latin word adolescence which means growing up. It is a period of transition in which the individual transforms from childhood to adulthood. The transition involves biological (i.e. puberty) social and psychological changes. Adolescence is a time of transformation in many areas of an individual's life. In the midst of these rapid physical, emotional and social changes, youth begin to question adult standards and the need for parental guidance; it is also a time individuals make important decisions about their commitments to academics, family and perhaps religion. Young children begin to ask question such as "is chemistry important to me"? And "how do I want to spend my time in studying chemistry" the choices that adolescence make regarding their motivation engagement and achievement in school (and in life) and the satisfaction they obtain from their choices depends in part on the context in which they make such choices [14].

Teachers, parents and peers all provides adolescents with suggestions and feedback about what they should think and how they should behave in social situations. This model can be a source of motivation or lack thereof. Modeling refers to individual changes in cognition, behavior, or affects that result from the observation of others [14]. Peers can also provide many positive elements in adolescent's life. It is important, however to remember that peer influence can potentially have a deadly impact or other various negative effect, it vital for educational related professional such as science teachers or chemistry teachers to understand the complex aspects of peer influence on achievement in other to stop the negative effect before they occur. Cambridge Essential Dictionary [12] defined achievement as how well a student has learned what he/she is expected to know or something good that one has done that was difficult. Oxford Advanced Learners Dictionary (7th edition) defined academic as something connected to education especially studying in schools and universities, involving a lot of reading and studying.

Through interaction over many years acceptable social customs are taught and fostered. Other children as well as adults can have a great impact on a broad range of issues in the child's life including achievements in school. The kind of group a particular child identifies with will sometimes determine the kind of influence the group will have on his academic achievement. Children if not checked often associate with bad friends and this could have a great negative impact on them. During the period of adolescence, the amount of influence that peer group has on one's academic achievement could be enormous. Peer influence can have both positive and negative effects on an adolescent's academic performance. Thus the ways and manners by which peer group influence affects adolescents' academic performance needed to be researched and documented.

1.1. Research Questions

The following research questions were raised to guide the study:

1. Does peer group influence affect the academic achievement of chemistry students?

2. Does peer group influence affect performance of male students as compared to that of female students in chemistry?

3. Does peer group influence affect performance of students that belong to peer group as compared to those that do not belong?

1.2. Research Hypotheses

The following null hypotheses were formulated and tested at; 0.05 level of significance:

Ho₁: There is no significant difference between students that belong to peer group and those that do not belong to peer group on the academic achievement of chemistry.

Ho₂: There is no significant difference between the academic achievements of male students as compared to female students in chemistry that are involved in peer group.

Ho₃: Peer group influence has no significant relationship with chemistry achievement.

1.3. Literature Review

A study by Bankole and Ogunsakin [2] investigated the influence of peer group on the academic performance of secondary school students in Ekiti State where a total of 225 secondary school students were randomly selected from five mixed secondary schools. The instrument used in the study is the Peer Group and Adolescent's Academic Performance (PGAAP) questionnaire. The reliability of the instrument was determined through test-re-test method. The finding showed that peers relationship influence academic performance of secondary school students.

Relying on longitudinal panel data from Texas, Hoxby [7] estimate substantial peer effects on student achievement by comparing the idiosyncratic variation in adjacent cohorts race and gender composition within a grade within a school. The author argues that the identification strategies are credibly free of selection biases because the between-cohort peer variations are beyond the easy management of parents and schools. Another study by Sacerdote [15] uses very similar strategies to Hoxby's to examine classroom level peer impacts, and find that a high proportion of a female classmates improve both boys and girls academic performance. Both studies avoid simultaneity bias by only examining only predetermined peer characteristics such as peer race and gender.

The peer group is a source of affection, sympathy, understanding, and a place for experimentation. It is always possible for parent to talk with school counselors and professionals to help with the problem Allen, Porter, McFarland, Marsh, and McElhaney [1] reported that adolescents who were well-liked by many peers displayed high level of ego development and secure attachment, as well as better interactions with their best friends. It was found that associating with students who have a positive affect toward enhanced students own satisfaction with school whereas associating with friends who have a negative affect toward school decreased it [14]. From a social competency perspective, it is likely that students who have difficulty establishing themselves in a peer

group may also have academic difficulties in school [16]. While the differences are more observed between adolescents that are neglected and those who are rejected.

Experiencing peer rejection can produce heightened anxiety (e.g. worry over being teased or left out) which interferes with concentration in the classroom and impedes children's acquisition and retention of information [10]. The finding emphasizes the importance of which elements are most important in affecting the academic arrivals. However, the percentage of teenager's friends with academic orientation itself is not predictive of academic achievement [6] which may be an evidence of lack of peer influence academic achievement, or a need to investigate other aspect of friendship beyond the similarity in academic success.

Hoxby [7] exploits exogenous variation in peer composition in adjacent years at the school grade level in elementary schools in Texas. The findings showed that peers effects in education ranging from close to zero to about 0.50 standard deviations [7]. In studies where it was possible to identify classmates are possibly are missing out on information on the real reference group of a student. The critical point in measuring the influence of peers is to identify the real peers. Keeping in mind that students spend a relatively big part of their time in class and it seems to be a credible assumption that their classmates are a good proxy of their group peers. However, in some cases there can be significant variation between classes within school- grades and hence the assumption that school grade peers are a good proxy of classmates can be quite strong.

2. Materials and Methods

2.1. Research Design

A research design is a plan or blueprint, which specifies how data relating to a given problem should be collected and analyzed. On this basis a survey, causal-comparative research design was used to compare the relationship between peer group influences on academic achievement. Survey research is aimed at collecting data on a particular problem from a sample in order to get an estimated dimension of the problem in a large population.

2.2. Sample and Sampling Techniques

The population of comprises of all students from three Secondary Schools in Jalingo metropolis .The sample of this study comprises of 120 SS3 (12th Grade with equal number of males and females) chemistry students randomly selected from three schools from in Jalingo Metropolis. The selection of the school was based on the following criteria: It must be a co- educational school. The section of the class will be carried out as follows: The class must be a science class, since each of the school contained only one arm of science class. The science class was automatically used as sample. 40 students were selected in each school using random stratified technique. One hundred and twenty (120) questionnaires and one hundred and twenty (120) achievement test was used for the research and splinted equally among the target population which comprises of three (3) mixed schools.

The questionnaires and achievement test was administered by the researchers and collected back at the end of their responses.

2.3. Instrumentation

Two instruments were used for the collection of data for the study. The construction and validation of each instrument was done as follows:

2.3.1. Peer Group Influence Achievement Questionnaire (PGIAQ)

The Peer Group Influence Assessment Questionnaire (PGIAQ) with 15-items was used as instruments or technique in data collection. The researcher used closed ended question which consist of five point scale as follows: Strongly agree (SA), Agree (A), Undecided (U), and Disagree (D), strongly disagree (SD) answer. The questionnaires comprises of two section "A" contains the bio data of the respondents while section "B" contains the research questions. Mean of 3.00 and above is taken as agree while mean below 3.00 is considered disagree.

2.3.2. Chemistry Achievement Test (CAT)

An achievement test was used as an instrument or techniques in data collection. The test contains 50 items, and each item was 2marks. Finally, the instruments discussed above, was developed by the researchers themselves for the purpose of this study.

2.3.3. Validation and Reliability of Instruments

The PGIQ was validated by experts from science education department Taraba State University, Jalingo. The reliability of a test instrument is the ability of the individual to take the test, it is consistency with which it measure what it intended to measure .It gives an indication of the extent to which a particular measurement is consistent and reproducible. The reliability of the instruments were pilot-tested and analyzed using Cronbach Alpha and Kuder-Richardson 21 formula, a reliability index with reliability coefficients of 0.85 and 0.87 for PGIAQ and CAT respectively; which proved that the instrument was reliable and thus suitable for the study. An achievement test was given to the students, the test contains 50-items marked by 100%, each question carries 2marks, and the scores were all subjected to t- test at 0.05 significant level; using Statistical Package for Social Sciences (SPSS) 17.0 and Pearson Product.

2.3.4. Administration of Instrument

The researchers administered the questionnaires and achievement test very strictly complying with the ethics of research as there was coercion the right to the respondents' privacy was respected.

2.4. Method for Data Analysis

The researchers used mean and standard deviation in answering the research questions. T-test and Pearson Product Moment Correlation; significant at 0.05 and 0.01 level (2- tailed) respectively were used in testing the hypotheses. Statistical package for social sciences (SPSS),

version 16 was used in analyzing the data. The decision of accepting or rejecting the research question was taken as follows: Decision = $5+4+3+2+1/5 = 3.00$.

Therefore, mean of 3.00 and above is taken as agree while mean below 3.00 is considered as disagree.

3. Results

The result are presented according to how the research question were framed and the mean rating of 3.00 and above is taken as agree while mean below 3.00 is considered as disagree.

Research Question 1: Does peer group influence affect the academic achievement of chemistry students?

Table 1 showed that the students agree on ten items and disagree on five items. The students agree that they belong to a peer group (mean=4.03), they spend much time with their peer group (mean =3.88), their current achievement in chemistry is better than the previous one before they met their friends (mean =4.11), they and their friends are always punctual to chemistry class (mean =3.83), they compete for good grades with their friends (mean =4.25), study chemistry together after class (mean =4.12), always help each other with academic difficulties (mean =4.11), their friends assist them in improving their grades in chemistry (mean =3.95), they always solve any assignment given to them chemistry (mean =4.15), they always revised chemistry together before examination and test (mean =4.17).

However, the students disagree that, they skip chemistry classes to spend time with friends (mean =1.99), they also disagree that, their current achievement in

chemistry is worse than the previous one before they met their friends (mean =2.39), disagree that friends persuade them in the class while chemistry lesson is going on, disagree always performing experiment during chemistry class (mean =2.98), and finally they disagree that they dislike chemistry as subject (mean =2.06).

Research Question 2: Does peer group influence affect the performance of male students compared to that of female students in chemistry?

As seen in Table 2, both male and female students agree on ten items and disagreed on 5 items. The students agree that they belong to a peer group (mean=4.00) for male and (mean= 4.06) for female respectively, spend much time with their peer group (mean =3.96) for male and (mean =3.78) for female, their current achievement in chemistry is better than the previous one before they met their friends (mean =3.98) for male and (mean =4.25) for female students, they are punctual to chemistry class with friends (mean =3.76) for male and (mean =3.90) for female students, they compete for good grades (mean =4.20) for male and (mean = 4.31) for female, they study chemistry together after class (mean =3.96) for male and (mean =4.28) for female, they always help each other with academic difficulties (mean =4.10) for male and (mean =4.13) for female, their friends assist them improve their grades in chemistry (mean =4.03) for male and (mean =3.86) for female, they and their friends always solve any assignment given to them in chemistry (mean =4.21) for male and (mean =4.08) for female students, they and their friends always revised chemistry together before examination and test (mean =4.38) for male and (mean =3.96) for female students.

Table 1. Peer group influence on academic achievement

S/N	Item	Mean	SD	Remark
1	I belong to a peer group	4.03	1.07	Agree
2	I spend much time with my peer group	3.88	1.01	Agree
3	My current achievement in chemistry is worse	2.39	1.30	Disagree
4	My current achievement in chemistry is better than the previous one before I met my friends	4.12	1.01	Agree
5	I often skip chemistry classes to spend time with my friends	1.99	1.19	Disagree
6	I and my friends are always punctual to chemistry class	3.83	1.01	Agree
7	I and my friends compete for good grades	4.26	.75	Agree
8	We study chemistry together after class	4.12	.82	Agree
9	We always help each other with academic difficulties	4.12	.66	Agree
10	My friends have assisted me improve my grades in chemistry	3.95	.96	Agree
11	I and my friends always solve any assignment given to us in Chemistry	4.15	.76	Agree
12	My friends like to persuade me in the class while the chemistry lesson is going on	2.45	1.30	Disagree
13	We always perform experiment during chemistry	2.98	1.26	Disagree
14	I and my friends always revised together before chemistry examination and test	4.17	.78	Agree
15	I and my friends dislike chemistry as a subject	2.06	1.32	Disagree

Table 2. Mean responses between male and female students on peer group influence.

S/N	Item	Male	Female	Remark
		Mean (SD) N=60	Mean (SD) N=60	
1	I belong to a peer group	4.00(1.19)	4.07(0.94)	Agree
2	I spend much time with my peer group	3.97(0.90)	3.78(1.10)	Agree
3	My current achievement in chemistry is worse	2.18(1.22)	2.60(1.34)	Disagree
4	My current achievement in chemistry is better than the previous one before I met my friends	3.98(1.14)	4.25(0.83)	Agree
5	I often skip chemistry classes to spend time with my friends	2.06(1.07)	1.91(1.30)	Disagree
6	I and my friends are always punctual to chemistry class	3.76(1.03)	3.90(1.00)	Agree
7	I and my friends compete for good grades	4.20(0.81)	4.31(0.67)	Agree
8	We study chemistry together after class	3.96(0.81)	4.31(0.67)	Agree
9	We always help each other with academic difficulties	4.10(0.68)	4.13(0.65)	Agree
10	My friends have assisted me improve my grades in chemistry	4.03(1.20)	3.86(0.65)	Agree
11	I and my friends always solve any assignment given to us in Chemistry	4.21(0.78)	4.08(0.74)	Agree
12	My friends like to persuade me in the class while the chemistry lesson is going on	2.25(1.29)	2.66(1.29)	Disagree
13	We always perform experiment during chemistry	2.91(1.18)	3.05(1.34)	Disagree
14	I and my friends always revised together before chemistry examination and test	4.38(0.76)	3.96(0.76)	Agree
15	I and my friends dislike chemistry as a subject	1.93(1.51)	2.20(1.08)	Disagree

However, the students disagree that their current achievement in chemistry is worse than the previous one before they met their friends, disagree that they often skip chemistry classes to spend time with their friends, disagree that their friends persuade them in the class while the chemistry lesson is going on and also disagree that they dislike chemistry as subject.

Research question 3: Does peer group influence affect performance of students that belong to peer group as compared to those that do not belong?

In Table 3, it can be seen that the respondent agree on 11 items. They agree on belonging to a peer group, spending much time their friends, current achievement better than the previous one before they met their friends, they are punctual to chemistry class, they compete for good grades, they study chemistry together after classes, they always help each other with academic difficulties, their friends assist them improve their grades in chemistry, they always solve any assignment given to them in chemistry, they always revised together before chemistry examination and test.

However, those who do not belong to peer group disagree on four items. They disagree that they belong to peer group, Their current achievement in chemistry is worse than the previous one before they met their friends, skipping chemistry classes to spend time with friends, friends persuade them in the class while chemistry class is

going on, performing experiment during chemistry and dislike chemistry as a subject.

Testing of hypotheses

Ho₁: There is no significant difference between students that belong to peer group and those that do not belong to peer group on the academic achievement of chemistry.

Table 4 showed the influence of peer group on the academic achievement of the respondents. The students that are involved in peer group have a mean achievement of 59.61 while those that do not belong to peer-group have a mean achievement of 44.57%. The p- value of 0.00 is less than the alpha value ($\alpha = 0.05$). This means that, there is significant difference between the two groups on their academic achievement. Therefore, the null hypothesis was rejected.

Ho₂: There is no significant difference between the academic achievements of male students as compared to that of female students in chemistry that are in involved in peer group.

Table 5 showed the difference between the academic achievement of male and female students respondents that are involved in peer group. The male students have a mean of 54.96% while the female students have a mean of 58.98 %. The p- value of 0.15 is greater than the alpha value ($\alpha = 0.05$). This means that, there is no significant difference between the academic achievements of male and female chemistry students that are involved in peer group. Therefore, the null hypothesis is accepted.

Table 3. Mean response of students that belong to peer group and those that do not belong to peer group

S/N	Item	Peer Group	Non-Peer Group	Remark
		Mean (SD) N=99	Mean (SD) N=21	
1	I belong to a peer group	4.45(0.50)	2.04 (0.74)	Agree/Disagree
2	I spend much time with my peer group	3.93(0.86)	3.57(1.50)	Agree
3	My current achievement in chemistry is worse	2.40(1.35)	2.33(1.01)	Disagree
4	My current achievement in chemistry is better than the previous one before I met my friends	4.22(0.90)	3.61(1.28)	Agree
5	I often skip chemistry classes to spend time with my friends	2.07(1.21)	1.61(1.02)	Disagree
6	I and my friends are always punctual to chemistry class	4.28(0.72)	4.14(0.85)	Agree
7	I and my friends compete for good grades	4.28(0.72)	4.14(0.85)	Agree
8	We study chemistry together after class	4.11(0.87)	4.19(0.51)	Agree
9	We always help each other with academic difficulties	4.15(0.64)	3.95(0.74)	Agree
10	My friends have assisted me improve my grades in chemistry	4.05(0.89)	4.47(1.16)	Agree
11	I and my friends always solve any assignment given to us in Chemistry	4.19(0.73)	3.95(0.86)	Agree
12	My friends like to persuade me in the class while the chemistry lesson is going on	2.51(1.30)	2.19 (1.32)	Disagree
13	We always perform experiment during chemistry	3.09 (1.24)	2.47(1.24)	Agree/Disagree
14	I and my friends always revised together before chemistry examination and test	4.29(0.57)	3.61(1.28)	Agree
15	I and my friends dislike chemistry as a subject	4.29(0.57)	3.61(1.28)	Agree

Table 4. t-test difference between students that belong to peer group and those that do not belong to peer group on the academic achievement of chemistry

Variable	N	Mean	SD	Df	t-value	p-value	Remark
Belong to peer	99	59.60	13.64	118	4.350	0.000	Significant Ho ₂ rejected
Do not belong to peer group	21	44.57	17.56				

Table 5. t-test difference between the academic achievements of male students as compared to female students in chemistry that are involved in peer group

Variable	N	Mean	SD	Df	t-value	p-value	Remarks
Male	60	54.96	14.84	118	-1.43	0.15	Not Significant Ho ₂ not rejected
Female	60	58.98	15.86				

H₀₃: Peer group influence has no significant relationship on students' chemistry achievement

Table 6. Relationship between peer group influence and chemistry achievement

Variable	1	2
1 Peer group influence	1	0.262**
2 Achievement	0.262**	1

** Correlation is significant at the 0.01 level (2- tailed).

Table 6 showed that, there is a positive and significant relationship between peer group influence and academic achievement of students in chemistry. Therefore, the null hypothesis was rejected.

4. Discussion of Findings

This section discusses the findings of the study and explains the data gathered from the field through the questionnaires distributed. It analyses the data with reference to the puzzles which the study set out to unravel that is, the research questions.

The result on the findings showed that most secondary school students about 82.5% belong to a peer group, most peer group compete for good grade in chemistry and the competition is more in males than in females, students in peer group always solve assignments together and help each other with academic difficulties, their friends assist them improve their grades in chemistry, students always solve any assignment given to them in chemistry, always revised together before chemistry examination and test. The result on whether peer group influence affect the performance of students that belong to peer-group as compared to those that do not belong to peer group shows that 99 students belong to peer group with a mean of 4.45 and 21 do not belong to peer group with a mean of 2.04. The result also shows that peer group influence affect the performance of students that belong to peer group compared to those that do not belong to peer group as it makes them to be punctual to chemistry class, compete for good grades, study chemistry together after class, help each other with academic difficulties, revised chemistry together after class before examination and test. The result on t –test therefore, showed that there was a significant difference between students that belong to peer-group and those that do not belong on their academic achievement which supported other previous studies from Nicole, Ide, et al., and Bankole & Ogunsakin [2,8,11].

Also, on the significant difference between the academic achievement of male and female chemistry students that are involved in peer group, the result shows that male students have the mean of 54.96 while the female students have the mean of 58.98 and as such there is no significant difference between the academic of male and female chemistry students that are involved in peer group making the null hypothesis rejected. This finding also supported that of Bankole and Ogunsakin [2] whose results revealed that there is no difference of gender (male or female) on the academic performance of secondary school students.

The result as seen from Table 6 showed that there is a positive and significant relationship between peer group influence and academic achievement of students in chemistry. From the finding it can that the student's interaction and discussions improves student's academic performance. The findings were in line with other previous findings by Foster, [5] who asserted that apart from peer effects related to the classroom environment, students belonging to the same class tend to study and revise the subject together, so generating important externalities. Clearly, friendly teacher/student relationships boosted academic achievements of all members of a class. This finding also supports the works of Nicole, Ide, et al. and Bankole & Ogunsakin [2,8,11] whose findings also revealed that peers relationship influence academic performance of secondary school students since peer relationships in school allow the child to learn a host of skill; group interaction conflict resolution, and trust building, among others.

5. Conclusions

Based on the result from the study, the following conclusions can be drawn:

1. There is significant difference between students that belong to peer-group and those that do not belong to peer-group on the academic achievement of chemistry.
2. There is no significant difference between the academic achievement of male and female chemistry students that are involved in peer group.
3. There is a positive and significant relationship between peer group influence and academic achievement of students in chemistry.

6. Educational Implications

The following educational implications are made based on the findings of the present study:

1. The findings from this study is pertinent and had helped in unveiling the influence of peer group on the academic performance of a child as well as making an effort to strike a balance in the educational system in line with the national policy on education.
2. School authorities/teachers should pay attention towards encouraging peer group activities in schools especially in the area of group discussion.
3. Teachers should use teaching method that will encourage competition among the students.
4. Chemistry teachers should device a proper method of grouping students in group assignments to encourage students' participation.
5. With the use of peer group activities, students' perceptions that science courses such as chemistry are learned by memorization can be prevented.
6. The students should be assisted by counselors in the choice of friends he/she makes as this would go a long way to shaping his/her future and preventing negative attitudes.

7. Students and school stakeholders should be made aware of the benefits of peer group prior achievements as it greatly influences academic performance of students in secondary schools.

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