

What Factors Affect Rural Teenager Students' Academic Performance and Well Beings? A Study of Surveys from Rural Elementary and Middle School Students in Henan Province

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Abstract: This study examines the factors that have effect on rural teenager students' academic performance and wellbeing using 25-question survey results from 661 students who ranged from second to eighth grade in one middle school and five elementary schools in Guantang County area, Henan Province. After controlling the demographic variables such as quantity of family members, parents' occupation, and education level, etc., the results show that satisfaction of student's living environment, learning environment and lunch, along with factors such as level of teacher's attention, depress and confidence has positive effect on rural students' overall wellbeing and academic standing. We also found that those factors are also effective to left behind children and students from poor households. Lastly, implication and limitations of this study are discussed.

1. Introduction

1.1 Background

In 2015, the People's Republic of China officially initiated its campaign to eradicate poverty by implementing "Targeted Poverty Alleviation (TPA)." Aiming to lift over 70 million poverty population out of the poverty line by 2020. TPA has contributed significantly to educational inequality in China at elementary and middle school levels; nine-year compulsory education is available to all children from rural poor households, and the completion rate in 2020 was 94.8 percent[1]. Over five years, the central government has invested 11 billion RMB in training nearly 9 million local teachers; a total of 950,000 teachers have been recruited, covering more than 1,000 counties in central and western provinces and more than 30,000 rural schools[2]. The campuses were rebuilt with brand new libraries and teaching facilities. Although the government's efforts to ensure every child's education are remarkable and they have led to great results, nobody has examined the effect of the educational poverty alleviation policies on the aspect of rural elementary students' grades and subjective well-beings (SWB).

Therefore, the primary objective of this study is to determine the primary factors that affect students' grades and subjective well-beings. So the policy makers could better incorporate those factors when making new policies.

1.2 Studies and Hypothesis

Compared to the completeness of a campus's teacher facilities, the wellbeing and academic achievement are better indicators to show the effect of policy to educational inequity. The relationship between students' grades and wellbeing has been investigated by many notable scholars in the educational field. Existing studies have shown that there is a positive correlation between wellbeing and academic performance in college students [3][4][5][6][7](Borrello, 2005; Ayyash-Abdo,2012; Turashvili,2012; Shareef, 2015; Chattu, 2020). According to Bukhari[8]: "academic performance is significantly negatively related to depression and significantly positively related to subjective happiness and life satisfaction." Tuna's study[9] even shows the interdependence of subjective wellbeing and academic success of first year university students.

There have also been some studies of the determinants of students' academic success and subjective well beings. Gutiérrez believes that teachers' autonomy support plays an important role in predicting university students' academic success[10]. Baker's study shows that a caring, supportive relationship with a teacher and a positive classroom environment have a positive effect to students' wellbeing by as early as third grade[11]. In Chen's report, a constructivist learning environment, Clear goals and coherence of curricula and student-student cooperation are also determined factors to well beings[12]. However, Dehlefs' study shows that a constructivist environment only has direct impact on students' attitudes but no support of their achievement [13]. Further investigations are still needed to determine what exactly affect the

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wellbeing and achievement of teenager students in the context of the ones in poor households of the rural areas.

Our first hypothesis is that satisfaction of student's living environment, learning environment and lunch has positive effect on rural students' overall wellbeing and academic standing. Our second hypothesis is that the factors such as possession of electronic devices, having many friends at school, level of teacher's attention, depress and confidence also have positive effect on rural students' overall wellbeing and academic standing.

2. Data and key variable measurements

Data were collected from a field survey carried out in 2022 in the Guantang County, Shangqiu, Henan province, China, one of the most poverty-stricken areas in the country. This location is chosen because of its geographic location, poverty rate, and left-behind children percentage. Shangqiu is located at the boarder of Henan Province where the Shandong, Henan, and Anhui Province meet. Those three provinces consist of almost a quarter of the China's population. As a result, this location would reflect the general outcome of the effect of this national project. In addition, Henan is an agro-based province where it lacks the resources for industrial development. Because of its role of maintaining food

security for China's population, the average income per capita in Henan is lower than that of other provinces. Thus, it is understandable that Henan consist of many people who live below the poverty line. This gives us the opportunity to explore the effect of TPA in the poverty-stricken areas. Lastly, because of the above-mentioned reason, many parents decided to leave Henan to seek for better job opportunities. Their children often remain at home and are taken care by their extended family which in most cases are their grandparents. Therefore, we can further determine the correlation between TPA and those children who remain at home and study at the suburban areas. In conclusion, the field survey conducted in Guantang County would reflect the TPA effect on poverty-stricken students, left-behind students and general students as control group.

This survey was conducted in one middle school and five elementary schools in Guantang County area. The survey was printed out and distributed by the teachers to each student. Students who participate in the survey are ranged from second grade to the eighth grade. After data cleaning that removed samples with missing information, we obtained 661 valid samples for the empirical analysis.

2.1 Key variable measurements

2.1.1 Descriptive statistics

Table 1. Standardized coefficients of the structural model.
Descriptive statistics of dependent and independent variable (self-painted)
(a field survey carried out in 2022 in the Guantang County, Shangqiu)

Variable	Obs	Definition	Mean	Std.Dev.
ID	661		331	190.9585
Grade	522		4.588123	1.70831
School	522		2.992337	1.382624
Gender	522		0.4559387	0.4985326
FamilyMember	521	Number of family members (persons)	5.31286	1.515309
FatherJob	522	1 if Farming/Labor related work , 2 if Transportation related, 3 if Doctor/Nurse , 4 if Sales orSmall Business Owner, 5 if Education, 6 if Technical jobs,	1.348659	1.159575
MotherJob	522	7 if Military Firefighters, Police	1.427203	1.401763
Illness	522	1 if chronic disease or disability in the family,0 otherwise	0.1091954	0.3838782
ParentEdu	522	1 if middle school or Lower, 2 if high school, 3 if secondary specialized school, 4 if technical school, 5 bachelor's degree or higher	1.363985	0.7748976
LiveWith	522	1 both parents, 2 father or mother, 3 grandparents, 4 other relatives, 5 by oneself	2.051724	0.7905433
MeetFrq	522	1 if many times per week, 2 if many times per month, 3 if a couple times a year or longer	1.670498	0.875477
ContactFrq	513	1 if many times per week, 2 if many times per month, 3 if a couple times a year or longer	1.17154	0.509489
PrivateBath	513	1 if respondent has a private bath at home; 0 otherwise	0.920078	0.5223953
Electronics	513	1 if respondent has a electronics such as TV, Computer, Phones at home; 0 otherwise	0.9376218	0.2651794
AvgScore	327		81.73624	16.4816

PovertyReg~d	333	1 if respndent's family has enrolled in the TPA program, 0 otherwise	0.0690691	0.2539532
FamilyinDi~s	522	1 if respondent either does not have private bath, electronics, or enrolled in TPA program	0.2528736	0.435076
StayatHome~d	522	1 if respondent's frequency of meeting his/ her parent is a couple times a month or fewer	0.4176245	0.4936407

Table 1 presents descriptive statistics in the survey including family size, parents' occupation, chronicle illness, parents' education level, student's living situation, meeting and communication frequency and whether there are private bathroom and electronic devices in the household. As shown in the panel, the average family size of student in the survey is 5.31286. Most of the surveyed students' parents participated in either farming or labor-related jobs such as working in construction sites or factories. The proportion of students who have chronical disease or disability in the family is about 10% of the whole student size. The education level of rural students' parents in general are not high. With a mean of 1.363985, most parents have an education level of high school or lower. As mentioned above, Henan is a largely populated province that provides limited job opportunities. Many

people have to leave home to seek employments. This phenomenon can be found in the data: the mean of the "Livewith" and "Meet Frq" variable is 2.051724 and 1.670498 which means that many surveyed students are either live with only one of their parents or with their grandparents. Many of them could only see their parents a couple time a month or even a year. As the data shows, around 7% of the student population are enrolled in TPA or other similar social programs. In this research, whether or not having private bath and electronic devices in the household are also used as a criteria of recognizing the poor households.

2.1.2 Indicators for the measurement of subjective well-being

Table 2. Subjective Wellbeing Variables (self-painted)

Variable	Obs	Definition	Mean	Std.Dev.
ParentRela~p	522	1 if very good, 2 normal, 3 not well, 4 bad	1.249042	0.7220473
Friends	513	1 if many friends, 2 if a couple friends, 3 no friends	1.424951	0.5364827
TeacherAtt~n	513	1 if respondent feel his/her teachers care about him/her, 2, neither care or don't care, 3 don't care	1.62768	0.649349
Depress	512	1 if respondent feel depressed; 0 otherwise	0.3496094	0.4894582
Confidence	512	1 if respondent fell very confident in class, 2 confident, 3 neither confident or unconfident, 4 unconfident, 5 very unconfident	1.890625	0.8131442
LivingSat	520	1 if respondent fell very satisfied in his/her living environment, 2 satisfied, 3 neither satisfied nor unsatisfied, 4 unsatisfied, 5 very unsatisfied	1.540385	0.7541177
LearningSat	520	1 if respondent fell very satisfied in his/her learning environment, 2 satisfied, 3 neither satisfied nor unsatisfied, 4 unsatisfied, 5 very unsatisfied	1.684615	0.7953101
LunchSat	520	1 if respondent fell very satisfied in his/her lunch at school, 2 satisfied, 3 neither satisfied nor unsatisfied, 4 unsatisfied, 5 very unsatisfied	2.146154	1.153776
EnjoyLearn~g	520	1 if respondent strongly agree that he/she enjoys learning, 2 agree, 3 neither agree nor disagree, 4 disagree, 5 strongly disagree	1.721154	0.7883635
LivingImpr~t	520	1 if respondent strongly agree that his/ her living environment has improved over the past two years, 2 agree, 3 neither agree nor disagree, 4 disagree, 5 strongly disagree	1.728846	0.7934793
Goal	520	1 if respondent has clear goals, 0 otherwise	0.9	0.3002889
ContinueSt~y	520	1 if respondent wants to continue study till college or higher, 2 highschool, 3 middle school, 4 technical school, 5 other	1.553846	1.170027
GradeLvl	520	1 if respondent think his/her grade is excellent, 2 above average, 3 average, 4 below average	2.230769	0.8738413
GradeImpro~t	521	1 if respondent think his/her grade has improved, 2 stays the same, 3 regress	1.652591	0.7045443

According to Schimmack, SWB is defined as “a person’s cognitive and affective evaluations of his or her life[14]. Therefore, in Table 2 we represents the subjective valuation of students themselves and their surrounding environment. Besides “goals” and “depress” variables that are set in a true-false setting, all of the variables are measured in a 5 point of scale ranging from 1(strongly agree) to 5 (strongly disagree) which a lower score indicate a high level of satisfaction on their different part of life such as learning and living environment, lunch, confidence, relationship with parents. We also use this 5-point scale to ask students evaluate their own confidence and grade level; (1 means very confident and excellent at school and 5 means unconfident and not doing well at school). Lastly, we also asked student to choose whether their overall grade has improved where 1 is “improve” and 3 is “regress.” In this research, the independent variables are Electronics, Friends, TeacherAttention, Depress,

Confidence, LivingSat, LearningSat, and LunchSat. The dependent variables are EnjoyLearning, LivingImprovement, Goal, ContinueStudy, GradeLvl GradeImprovement, and AvgScore. The control variables are Gender, FamilyMember, FatherJob, MotherJob, Sickness, ParentEdu, LiveWith, ParentRelationship, MeetFrq, ContactFrq, and PrivateBath. By measuring those descriptive and subjective variables, we hope to find the connections between students’ satisfaction and their improvement in well-being and grades.

3. Empirical Results

3.1 The construct validity of measurement scales

Table 3. Regression Analysis of Teacher’s Attention Variable of All Rural Students (self-painted)

Variable	EnjoyLearn~g	Living Improvment	Goals	ContinueSt~y	GradeLvl	GradeImpro~t
TeacherAtt~n	.313*** (0.000)	.062 (0.243)	-.070*** (0.000)	.246*** (0.002)	.289*** (0.000)	.277*** (0.00)
ControlVariable	Yes	Yes	Yes	Yes	Yes	Yes
Cons	.619 (0.001)	.878 (0.000)	1.115 (0.000)	.120 (0.677)	1.517 (0.000)	.913 (0.000)
Number of obs	510	510	510	510	510	510
R-squared	0.116	0.059	0.049	0.064	0.061	0.101

After eliminating the independent variables that have little effect on the dependent variables, we found that independent variables such as TeacherAttention, Depress, Confidence, LivingSat, LearningSat, and LunchSat have effects on rural students overall welling being and academic standing.

As shown in Table 3, the factor loadings for Teacher Attention indicator were .313255(EnjoyLearning), .0622079 (LivingImprovement), -.0708035 (Goal), .2460893 (ContinueStudy), .2897701(GradeLvl), and .2776195 (GradeImprovement). Level of teacher’s attention is positively related with whether a student enjoy learning. The coefficient of Teacher’s Attention on Enjoy Learning is .313255. The p-value is 0.000 which is statistically significant. Teacher Attention indicator also positively correlated with Living Improvement Indicator with a coefficient of .0622079. However, the p-value of this correlation is 0.243 which is not statistically significant. The correlation between Teacher Attention indicator and

Goals is negative with a coefficient of -.0708035. The value is small enough to be neglect. The correlation between Teacher Attention and Continue Study is positive with a coefficient of .2460893. The p-value of the correlation is 0.002 which means that it is statistically significant. The correlation between Teacher Attention and GradeLvl is positive with a coefficient of .2897701. The p-value of the correlation is 0.00 which means that it is statistically significant. The correlation between Teacher Attention and GradeLvl is positive with a coefficient of .2897701. The p-value of the correlation is 0.00 which means that it is statistically significant. The correlation between Teacher Attention and GradeImprovement is positive with a coefficient of .2776195. The p-value of the correlation is 0.00 which means that it is statistically significant. In conclusion, Teacher Attention indicator has a positive effect on rural students’ Enjoyment of learning, Living Improvement, ContinueStudy, GradeLvl and GradeImprovement. This finding supports our second hypothesis.

Table 4. Regression Analysis of Depress Variable of All Rural Students (self-painted)

Variable	EnjoyLearn~g	Living Improvment	Goals	ContinueSt~y	GradeLvl	GradeImpro~t
Depress	.181** (0.011)	.013 (0.848)	-.022 (0.411)	.227** (0.031)	.199** (0.013)	.108*** (0.090)
ControlVariable	Yes	Yes	Yes	Yes	Yes	Yes
Cons	1.068 (0.000)	.971 (0.000)	1.010 (0.000)	.455 (0.087)	1.925 (0.000)	1.316939 (0.000)
Number of obs	510	510	510	510	510	510
R-squared	0.0623	0.0564	0.0264	0.0545	0.0273	0.0410

As shown in Table 4, the factor loadings for Depress indicator were .1810094 (EnjoyLearning), .0136894 (LivingImprovement), -.0222835 (Goal), .2274313 (ContinueStudy), .1997241 (GradeLvl), and .1084 (GradeImprovement). The Depress indicator collects 1 if respondent feel depressed; 0 if students fell otherwise. In Panel B we can see that Depress is positively related with whether a student enjoy learning. The coefficient of Teacher's Attention on Enjoy Learning is .1810094. The p-value is 0.011 which is statistically significant. Depress indicator also positively correlated with Living Improvement Indicator with a coefficient of .0136894. However, the p-value of this correlation is too high to be statistically significant. The correlation between Teacher Attention indicator and Goals is negative with a coefficient of -.0222835. Although the effect is significant the value is small enough to be neglect. The correlation between Teacher Attention and Continue Study is positive

with a coefficient of .2274313. The p-value of the correlation is 0.031 which means that it is statistically significant. The correlation between Teacher Attention and GradeLvl is positive with a coefficient of .2897701. The p-value of the correlation is 0.00 which means that it is statistically significant. The correlation between Teacher Attention and GradeImprovement is positive with a coefficient of .1084. The p-value of the correlation is 0.090 which means that it is statistically significant. In conclusion, Depress indicator has a positive effect on rural students' Enjoyment of learning, ContinueStudy, GradeLvl and GradeImprovement. This support our second hypothesis that rural student's happiness has a positive effect on rural students' overall welling being and academic standing.

Table 5. Regression Analysis of Confidence Variable of All Rural Students (self-painted)

Variable	EnjoyLearn~g	Living Improvment	Goals	ContinueSt~y	GradeLvl	GradeImpro~t
Confidence	.348*** (0.000)	.245*** (0.000)	-.063*** (0.000)	.267*** (0.000)	.365*** (0.000)	.205*** (0.000)
ControlVariable	Yes	Yes	Yes	Yes	Yes	Yes
Cons	.514 (0.005)	.557 (0.003)	1.112 (0.000)	.048 (0.864)	1.345 (0.000)	.990 (0.000)
Number of obs	510	510	510	510	510	510
R-squared	0.174	0.118	0.054	0.079	0.127	0.090

Table 5 measures the correlation between the Confidence indicators with other dependent variables. The Confidence indicator collects 1 if respondent fell very confident in class, 2 confident, 3 neither confident or unconfident, 4 unconfident, 5 very unconfident. As Panel C shows, the Confidence variable has a positive correlation with Enjoy Learning variable, with a coefficient of .347949. The p-value is 0.00. which means the coefficient is statistically significant. The confidence indicator also positively correlated with Living

Improvement variable with a statistically significant p-value of 0.00. The independent variable has a negative correlation with the Goal variable with a coefficient of -.0628444. This is significant as the p-value equals to 0.00. Moreover, the Confidence indicator also has positive correlation with ContinueStudy, GradeLvl and GradeImprovement. The coefficients are .2674176, .3659244, and .2054983. The p-values are all 0 which means they are significant. The findings in Panel C supports our second hypothesis.

Table 6. Regression Analysis of Living Sat Variable of All Rural Students (self-painted)

Variable	EnjoyLearn~g	Living Improvment	Goals	ContinueSt~y	GradeLvl	GradeImpro~t
LivingSat	.391*** (0.000)	.296*** (0.000)	-.080*** (0.000)	.143** (0.039)	.311*** (0.000)	.262*** (0.000)
ControlVariable	Yes	Yes	Yes	Yes	Yes	Yes
Cons	.757 (0.000)	.973 (0.00)	1.084 (0.00)	.437 (0.10)	1.714 (0.00)	1.124 (0.00)
Number of obs	519	510	519	519	519	519
R-squared	0.180	0.107	0.057	0.050	0.082	0.107

Table 6 analyzes the effect of Living Satisfaction on Rural students' wellbeing and academic standing. This indicator is measures 1 if respondent fell very satisfied in his/her living environment, 2 satisfied, 3 neither satisfied nor unsatisfied, 4 unsatisfied, 5 very unsatisfied. In Panel F, the factor loadings for LivingSat indicator were .3911076 (EnjoyLearning), .2968488

(LivingImprovement), -.0804968 (Goal), .1432514 (ContinueStudy), .3114864 (GradeLvl), and .262542 (GradeImprovement). Besides the ContinueStudy variable which has a p-value of 0.039, all of the other variables have a p-value of 0. As a result, they are all statistically significant.

Table 7. Regression Analysis of Learning Sat Variable of All Rural Students (self-painted)

Variable	EnjoyLearn~g	Living Improvement	Goals	ContinueSt~y	GradeLvl	GradeImpro~t
LearningSat	.483*** (0.000)	.267*** (0.000)	-.095*** (0.000)	.042 (0.519)	.327*** (0.000)	.204*** (0.000)
ControlVariable	Yes	Yes	Yes	Yes	Yes	Yes
Cons	.444 (0.007)	.613 (0.001)	1.143 (0.00)	.503 (0.072)	1.541 (0.000)	1.073 (0.000)
Number of obs	519	519	519	519	519	519
R-squared	0.275	0.123	0.079	0.043	0.099	0.084

Table 7 analyzes the effect of Learning Satisfaction on Rural students' wellbeing and academic standing. This indicator is measures 1 if respondent fell very satisfied in his/her learning environment, 2 satisfied, 3 neither satisfied nor unsatisfied, 4 unsatisfied, 5 very unsatisfied. The factor loadings for LearningSat indicator were .4835186 (EnjoyLearning), .2678926 (LivingImprovement), -.0950851 (Goal), .0423092

(ContinueStudy), .327822 (GradeLvl), and .2048834 (GradeImprovement). While all the other coefficients are statistically significant with a p-value of 0. The p-value of ContinueStudy is 0.519 which is too high to be significant. This finding support our first hypothesis that student's learning environment has positive effect on rural students' overall welling being and academic standing.

Table 8. Regression Analysis of Lunch Sat Variable of All Rural Students (self-painted)

Variable	EnjoyLearn~g	Living Improvement	Goals	ContinueSt~y	GradeLvl	GradeImpro~t
LunchSat	.307*** (0.000)	.152*** (0.000)	-.045*** (0.000)	.091** (0.047)	.160*** (0.000)	.156*** (0.000)
ControlVariable	Yes	Yes	Yes	Yes	Yes	Yes
Cons	.791 (0.000)	.823 (0.000)	1.060 (0.000)	.470 (0.103)	1.541 (0.000)	1.195 (0.000)
Number of obs	519	519	519	519	519	519
R-squared	0.231	0.099	0.047	0.049	0.099	0.093

Panel F analyzes the effect of Lunch Satisfaction on Rural students' wellbeing and academic standing. This indicator is measured using the same method as the above two indicators. The factor loadings for LunchSat indicator were .3076778 (EnjoyLearning), .1524487 (LivingImprovement), -.0456016 (Goal), .0918798 (ContinueStudy), .16072 (GradeLvl), and .1564517 (GradeImprovement). All of the coefficients are statistically significant. This support our first hypothesis that the lunch satisfaction also play a role on the improvement of rural students' wellbeing and academic standing.

except the Depress variable also have effects on family in distress students in the rural area. Factors such as possession of electronic devices, having many friends at school, after the empirical analysis, do not have statistically significant effect on rural students' wellbeing and academic standing.

4.2 Limitations and Implications

In this study, there are also some limitations that might hinder our outcome. The first limitation is that to protect students' privacy, we were unable to obscure their transcripts. The academic performance of those students was recorded from the measure of self-evaluation. As a result, there might be some deviations from their actual grades. Also, all of the surveys were distributed in Guan Tang County of the Henan Province, the results might not be representative of the whole nation.

There are also some implications of this study. Although the TPA has contributed significantly to educational inequity in the rural area, the contributions were usually measure by the tangible facilities such as how much money were spent and how many new campuses were built. Policymakers failed to incorporate the subjective measurements when implementing policies. Compared to the completeness of a campus's teacher facilities, the wellbeing and academic achievement are better indicators to show the effect of policy to educational inequity.

4. Conclusion

4.1 Key Findings

This study examines the effect of of the educational poverty alleviation policies on the aspect of rural elementary students' grades and well beings. By collecting 661 valid samples from survey conducted in one middle school and five elementary schools in Guantang County area, we found that the findings mostly corroborate with our hypothesis that satisfaction of student's living environment, learning environment and lunch, along with factors such as level of teacher's attention, depress and confidence has positive effect on rural students' overall welling being and academic standing. Those factors

We have found that student's living environment, learning environment, lunch, level of teacher's attention, happiness and confidence are the six primary determinants of students' wellbeing and academic standing. If policymakers could incorporate those factors when making new policies and use those factors to assess the performance of the teachers and headmasters, the educational inequity in the rural areas would be further eliminated.

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