SCHOOL CLIMATE QUALITY AND EDUCATION QUALITY: EVIDENCE FROM 15 WORST PERFORMING NATIONS AT PISA 2018

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Abstract. The core objective of this manuscript is to assess the effect of school climate quality on education quality in 15 worst performing nations on PISA 2018. The literature review explores the elements of school climate quality effecting quality of education in secondary schools. The school climate consists of at least three dimensions, specifically, safety environment, teaching and learning, and school community. The empirical analysis covers more than 120,000 observations from sample schools of developing countries. The main results derived using ordinary least squares estimation outcomes demonstrate that conducive school culture have a positive impact on pupil's achievement. In developing nations, students who perceived greater support from their teachers and considered their teachers were scored higher in cognitive assessment. A one-unite increase in the index of teacher support was associated with an increase of 0.01 score points, but statistically insignificant. Concerning the role of competition and cooperation, the results demonstrate that there is an insignificant impact on educational outcomes in developing nations, while parental involvement kept positive and significant association with cognitive achievement.

Keywords. education quality, quality of teaching, Secondary education, school climate

Introduction:

The importance of education quality in sustainable development is huge and has gained attention of majority of researchers, policy makers and governments. Thus, the positioning of this study on the effect of school climate quality on education quality in developing nations is motivated by two main reasons: the need to enhance learning outcomes in worst performing nations in PISA 2018 assessment, and the importance of school climate conditions in educational outcomes.

Firstly, education is fundamental instrument to improve productivity and access to employment opportunities by individuals, in turn, it enables nations to be sufficiently integrated with dynamic and competitive markets. From the individual perception, education is perceived as a tool to be equipped to get rid of poverty (Hannum & Buchmann, 2005). At the global level, high quality of education signifies one of the core elements of growth that improve nation's capacity to effectively adapt and catch advanced technology to ensure higher quality of living (Pelinescu, 2015; Danquah & Amankwah-Amoah, 2017). In this context, Nelson & Phelps (1966) emphasize that more resources devoted to education of individuals by government lead to achieve higher economic growth in a nation. However, education indicators confirmed that students in developing nations scored low marks in international assessments (PISA 2018). World Development Report (2018) established that in number of middle-income nations, abilities and skills of students are below what authorities of those nations seek, and millions of pupils spend their time at schools without learning anything, especially, in Africa and some parts of Asia. In fact, approximately 175 million young people in poor nations cannot read whole text or sentence, such as South and West Asia (UNESCO, 2018). Besides that, the Ethiopian Education Development Roadmap report stresses out that numerous Ethiopian secondary schools are lagging to enhance pupils' knowledge, skills and prepare them for the real-life work (Tirussew et at., 2018). Alike, Mbiti (2106) pointed out that even though there is a significant increase in number of students enrolled in schools in developing states, the level of achieved learning outcomes has been deteriorated (Michaelowa, 2001; Raymond, 1968). All in all, to achieve SDG Target 4, there is need significant enhancements to be implemented to widen access to all students to get knowledge along with enhancing quality of teaching and learning to achieve effective learning outcomes across nations. It necessitates to evaluate factors effecting quality of education in secondary schools to derive a solution to overcome above mentioned concerns in education system.

Secondly, quality of school climate is one the crucial factors determining the education quality. Hence, it has been concerned as 'quality and character of school life' (Cohen et al., 2009), and 'the heart and soul of school' (Freiberg & Stein, 1999). A cohesive, collaborative and safe school climate can create an

environment where all stakeholders ranging from school principals to students can feel encouragement, support and enthusiasm from each other (Hoy & Sweetland, 2001). Hoy and Miskell claim that school climate is the quality of physical or non-physical quality which is experienced by each stakeholder of educational entity that directly affect the quality of learning outcomes. It can also be described as 'the extension of the concept of work moral, as it is being associated with the attitude of principals, teachers, students and parents in carrying out their responsibilities. Thus, school climate can be traced in every aspect of school environment ranging from facilities, curriculum, leadership to interpersonal relationship between teachers, pupils, principals and learning processes in schools. Hence, School climate is comprising a set of characteristics that provide unique color and atmosphere to each school. Researchers on school climate support the view that creating a good climate in schools is important, under positive school culture teachers can deliver quality teaching, pupils can achieve favorable learning outcomes expected by society, parents are involved in their children's schoolwork, and principals might have good leadership (Hoy & Miskel, 2001). Based on the views discussed above it can be formulated that school climate is a unique condition perceived by each school, raised by interaction between teachers and students, students and students, teachers and principals, teachers and parents that distinguish a school from other schools and one of the main factors affecting learning outcomes in developing nations.

The current research evaluates the importance of various spheres of school climate including student disruptive behavior, teaching and learning, and school community on quality of learning outcomes in PISA Cognitive Skills among 15 worst performing nations by dealing with following questions: what is the effect of quality of school climate on quality of learning outcomes in developing nations? What are the dimensions through which school climate affect quality of learning outcomes in developing nations?

The rest of the paper is organized as follows: 'School Climate Quality and Education Quality: Literature Review' presents the literature review. 'Data and Methodology' demonstrates the methodology of the empirical analysis. 'Empirical results' discusses the outcomes of the analysis, and 'Conclusion' concludes the paper with a focus on policy recommendations.

Literature Review:

School climate has been considered as a significant tool in enhancing school quality and addressing educational challenges. A growing body of literature has examined the various aspects of school climate and their impact on quality of schooling (Bradshaw et al, 2014; Arter, 1989; Fisher et al, 1982). Therefore, this section is also devoted to address what composes a quality of school education. The following literature review provides a comprehensive overview of the key findings from these studies, along with additional details and limitations where applicable.

2.1. Measuring Education Quality

Determining school quality is completely baffling and complicated to measure and quantify due to its multifarious nature. There is no definite explanation and classification of education quality and there is no comprehensive agreement on what is the proper policy or approach to assure and manage quality in education system. Thereby, when addressing what composes a quality of school education, various stakeholders define quality in different ways. For instance, school principals, policy makers evaluate quality of schools in terms of high grades of students or admission rate of graduates into higher education, while other community members, parents are assessing quality of schools in terms of facilities implemented at school, school reputation, word of mouth and their observation (Schneider et al., 2017). Highlighting the substance nature of quality of education, Adams et al (1995) defined quality of education in terms of student achievement and controllable school inputs that has impact on student learning outcomes. He has shifted the focus from number of years schooling to the complex integration of inputs, processes and outputs related to enhanced model of learning.

Therefore, the growing accent on quality of education was sketched in a study by Muskin (1999) that provides general theoretical pivotal spot. First view of evaluating the quality of learning outcomes, predominant in both the research society and governmental authorities, refers the link between 'inputs' and 'outputs'. Here, inputs include several factors ranging from infrastructure, resources of the schools to family and socioeconomic conditions such as quality of school surroundings, textbooks, teacher salaries, curriculum, and learners' health and well-being. While the output comprises, students results on

assessments and examinations. Under this first approach, it is tended to detect inputs most highly related to favorable learning outcomes. However, it is very uncompanionable on the practices of school and classroom through which inputs desired level of outputs have been achieved (Muskin, 1999). However, this approach has been criticized due to having insufficient explanation about what derives quality of learning outcomes, what factors boost learners to stick to classroom and obtain valuable knowledge and respect (Hanushek, 2011; Schneider, 2017).

2.2. School Climate and Student Achievement

A vast literature has appeared on educational quality in recent years, examining factors that help improve education and proposing ways to promote better learning in schools. In a search for the factors that promote quality, countries' programs as well as the literature increasingly emphasize school climate and communities as the engines of quality, with teacher quality identified a primary focus.

A more recently established way of focusing on quality emphasizes the content, conditions and relevance of education. This way to quality concentrates on procedures in school activities and interactions between school and other stakeholders ranging from students to society. The main concentration is given to the process in which inputs cooperate at secondary schools form the quality of learning (Castro, M. et al., 2015; Muskin and Aregay 1999; UNISEF 2016, World Bank 2018). Interviewing city residents, conducting surveys, and running small focus groups with different sets of stakeholders, including all school principals, community leaders, teachers at each school, parents, and district administrators, Jack Schneider and Rebecca Jacobsen (2017) derived a constructive framework to measure school quality represents a fuller picture what parents and communities care in American schools. Authors criticized district authorities for tracking data on educational quality in terms of class size, attendance rates, on-time graduation rates, teacher turnover, spending on professional development or range of extra-curricular activities available for pupils in school. As a result, they constructed new framework representing three powerful input categories of school climate, namely, teaching environment, school culture and adequate recourses are the main factors producing high learning outcomes in schools, however, schools those are lacking those elements more likely stay behind. The rest two output categories in the given framework are academic learning student character and well-being which are resulted from strong inputs in schools. They stressed out that school quality should be measured fairly and accurately and proposed not to ranking schools against each other, instead, it is expected to demonstrate progress that each school is making, on multiple stages, to attain predetermined standards of quality or exceed those specific standards. Similarly, MacNeil et al (2009) asserts that a conducive environment in schools can have a tremendous effect on the learning satisfaction and personal growth of learners, in turn, this conducive school climate results in favorable student achievements. Hence, conducive school climate has a power to encourage learners to study well, and create an environment where both students and teachers feel a sense of security, comfort and freedom, as a result, it leads to improvement of learning outcomes and achievement of students. Strong relationship between school climate and learning achievements of students are examined and studied by majority of scholars (Allen et al., 2015; Aldridge et al., 2018; and Thapa et al., 2013).

2.3. Dimensions of School Climate

School climate is a multidimensional concept that represents atmosphere and mood of school environment (Wang & Degol, 2018). Though there is no final consensus on indicators that make up school climate, it is possible to derive three dimensions of school climate from previous studies (Thapa et al., 2013; Wang and Degol., 2016; Cohen et al., 2009):

First dimension of school climate is safety conditions, it can also be called student disruptive behavior. One of the key elements of conducive learning environment is disciplinary climate, where pupils listen what teachers instruct, there is no noise and disorder enabling learners concentrate on class tasks (Gottfredson et al., 2005; Moos, 1979; Cheem & Kirsantas, 2014). Main responsibility of school principals and teachers is to ensure conducive learning environment, it helps them to diminish disruptions and have plenty of time to cover curriculum and employ various teaching methods (Mostafa et al., 2018; Matsumura et al., 2008). On the other hand, if pupils feel that their teachers are unfair and biased in their relationships or interactions with other students in the classroom, the disruptive behavior of students will be vegetated (Pena-Shaff et al., 2019; OECD, 2016). Previous studies asserted that disruptive behavior

of students have negative effect on their academic achievements (Ning et al., 2015; Blank & Shavit, 2016; OECD, 2017).

Disruptive climate in school may lead to truancy and lateness of students, which in turn, those students lose the opportunity to learn (Hutzell et al., 2012). As a result, truancy might have an adverse effect on performance of students (Reid, 2005). Gottfired (2017) found out that majority of pupils skip classes or come to classes late due to not having the belonging feeling among other students, not being able to wake up earlier, or simply being needed at home for housework. Local authority, school principals and teachers devise strategies and actions to construct rapport with students to develop students' attachment to school and feeding a desire to attend classes and arrive on time every school day (Lehr et al., 2009).

Second strong dimension of school climate is teaching and learning environment in the school. There is a strong evidence that student achievement is highly associated with facilitators' professionalism, proper attitudes and commitment to learners, satisfaction in teaching process (Tschannen-Moran et al., 2006). Especially, teacher enthusiasm has a direct positive affect on student attitudes and academic achievement (Keller et al., 2016; Bettencourt et al., 1983). Encouraging teaching strategies including gestures, body expressions, voice intonations and use of humor trigger students' active learning environment. Indeed, research reveal that enthusiastic teachers are more likely to wake up intrinsic motivation of learners and upsurge the time that students spend on learning activities (Lazarides et al., 2019; Moe, 2016). Teacher enthusiasm can also boost student academic achievements via three paths: teacher enthusiasm highly attracts and keep learners' interest and attention in the lesson; enthusiastic teachers are the main role models for young individuals, implanting in them a love for study at school; therefore, passionate teachers always spread their positive aura to the class, in turn, create a warm positive learning environment (Kunter, 2013).

Third dimension of school climate is school community comprising student-teacher relationships, student competition and cooperation, and parental involvement. Currently, parental involvement in school activities is considered as a crucial element in producing positive learning environment. Parent school partnership takes place in the form of parents discussing school matters with their kids, helping with home tasks, ccommunicating with teachers to discuss educational progress of their kids (Boonk et al., 2018). Recent studies revealed that parental models most linked to high achievement of learners (Castro et al., 2015). However, there are plenty of studies found out that school-based parental model is only modestly linked to student outcomes (Jeynes, 2007; Desforges et al., 2003). Equally, competitive environment in school can also boost academic achievement of students and accelerate in learning. Johnson and Johnson (1979) asserted that interaction of cooperation and competition leads to higher motivation and achievements among school rather than in a purely cooperative or competitive environment. Some researchers argue that competitive environment can boost students' motivation in those schools with scare resources (Han et al., 2020, Kistruck et al., 2016).

While the aforementioned studies provide valuable insights into the relationship between school climate and education quality, various dimensions of school climate and school quality, it is essential to acknowledge their limitations. Many studies have focused on specific regions, which may limit the generalizability of their findings to other countries or contexts. Moreover, some studies may suffer from potential biases or limitations in their methodologies, such as sample selection or data availability. It is crucial for future research to address these limitations and conduct more comprehensive studies that encompass a broader range of regions, nations and schools.

Data And Methodology:

This piece of paper tries to investigate school climate factors that support 15-years-old students' performance in Cognitive Assessment in PISA 2018 among 15 worst performing nations.

The approach used in this study is to estimate a cross-sectional model of educational outcomes while taking into account for range of determinants of students' performance in nations. Following to Cohen et al., (2009), the econometric model of educational outcomes of students at the upper-secondary level is formulated as follows:

$$lnEQ_i lnEQ_i =$$
$$\beta_0 + \beta_1 Discipline_i + \beta_2 Bullying_i + \beta_3 Truancy_i + \beta_4 TeacherEnthusiasm_i +$$
$$+\beta_5 TeacherSupport_i + \beta_6 TeacherFeedback_i + \beta_7 Competition_i + \beta_8 Cooperation_i +$$
$$+ ParentInvolvement_i$$
$$\beta_0 + \beta_1 Discipline_i + \beta_2 Bullying_i + \beta_3 Truancy_i + \beta_4 TeacherEnthusiasm_i +$$
$$+\beta_5 TeacherSupport_i + \beta_6 TeacherFeedback_i + \beta_7 Competition_i + \beta_8 Cooperation_i +$$
$$+ ParentInvolvement_i$$
$$+\varepsilon_i \varepsilon_i \qquad (1)$$

Here $EQ_i EQ_i$ is the indicator of education quality in the country i. As literature confirms, 15-year-old students' scores on Cognitive skills in PISA international assessment is employed as a proxy to measure education quality (Michaelova, 2001; Altinok et al., 2014). Particularly, it is appropriate measurement for comparison purposes of human capital over different societies and regions. The average students' scores on the cognitive skills and knowledge are 386 for selected 15 worst performing countries in the sample and ranges from 115 to 754. According to the methodology used to collect data on this variable, the minimum score is 104 and the maximum score is 839. Breakspear (2014) asserts that the main core effect of PISA survey is its assistance in defining and quantifying policy problems that need to be tackled in the field of schooling. Therefore, it can inform schools and students how well they comprehend the subjects compared to their international and local peers. However, PISA standardized tests outcomes are also suffering from number of limitations. There is a raising concern related to PISA test as a measure of distinct environments where students study and learn across diverse national school programs. Independent variables are selected in reference to existing literature (Cohen et al., 2009; Michaelowa, 2001; Thapa et al., 2013; Schneider, 2017). Based on the articles reviewed above, this study focuses on nine aspects of school climate, grouped in three broad spheres illustrated in Figure 1. The student disruptive behavior dimension includes aspects of disciplinary climate, bullying and student truancy, while teaching and learning environment comprising teacher enthusiasm, teachers' support and feedback reflects classroom practices and teacher behavior to encourage students learning experience and achievement. School community comprises student competition, co-operation and parental involvement.

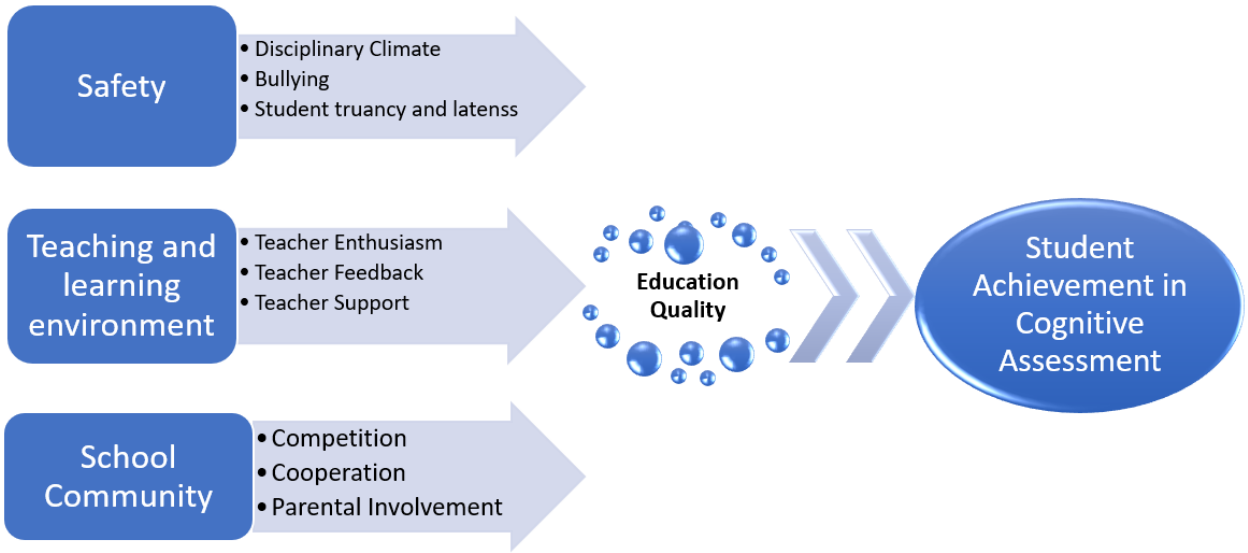

Figure 1. A Framework for School Quality: School Climate & Education Quality.

As classrooms with good disciplinary climate provide more teaching and learning opportunities for teachers and student with less disruptions, use of range of teaching methods, It has a direct impact on students' achievements. To evaluate relationship between disciplinary climate and students' academic outcomes, PISA asked pupils how frequently (never, some lessons, most lessons, every lessons) the

following events occur in their classrooms: 'Students don't listen to what teacher says', 'There is a noise and disorder', 'The teacher has to wait long time for students to quiet down', 'Students cannot work well', and 'Students don't start working for a long time after the lesson begins'. Disciplinary Climate Index was created using responses of PISA attending students. Obviously, positive values on this index imply that student appreciates a good disciplinary climate than the average student in selected nations.

To investigate students' attitudes bullying, PISA 2018 questioned students whether they agree (ranging from strongly disagree to strongly agree) with the following events: 'It irritates me when nobody defends bullied students', 'It is a good thing to help students who can't defend themselves', 'It is a wrong thing to join in bullying', 'I feel bad seeing other students bullied', and ' I like it when someone stands up for other students who are being bullied'. Accordingly, with the purpose of identifying predictors of student truancy and lateness, PISA questioned students to report the number of times (never, one or two times, three or four times, five or more times) they missed a whole day of school, and number of times they were late for classes before taking the PISA assessment. Permanent truancy not only have an adverse impact on student achievement, but also lead to drop out of school, lower paid jobs. Unfortunately, in Brazil, Georgia, Panama, Dominican Republic, Kazakhstan, Saudi Arabia education systems more than half students had skipped a whole day school 14 days before the exam.

Teacher enthusiasm is measured by asking 15-year-old students whether they agree (strongly disagree, disagree, agree and strongly agree) with the given statements about their teachers: 'It was clear to me that the teacher liked teaching us'; 'The enthusiasm of the teacher inspired me'; 'It was clear that the teacher likes to deal with the topic of the lesson'; and 'The teacher showed enjoyment in teaching'. I have created an Index of teacher enthusiasm by combining those statements. In the model, teacher support and feedback also reflected as students who obtained support and feedback from their teachers are more motivated in class activities, in turn, allows them to achieve higher grades (Lee, 2012; Federici and Skaalvik, 2014). To measure teacher support, in 2018, PISA questioned school pupils how often ('never or hardly ever', 'some lessons', 'most lessons', 'every lesson') the following events occur in their classes: 'The teacher shows an interest in every student's learning'; 'The teacher gives extra help when students need it'; 'The teacher helps students with their learning'; and 'The teacher continues teaching until students understand'. Similarly, Teacher support Index Created by combining students' responses. Teacher Feedback Index also constructed using pupils responses for the following statements: 'The teacher gives me feedback on my strengths in this subject'; 'The teacher tells me in which areas I can still improve'; and 'The teacher tells me how I can improve my performance' in 'in some lessons', 'many lessons', 'every lessons or almost every lesson' and ' never'.

Co-operation index was also created by asking students how true (not at all true, slightly true, very true and extremely true) the following things about their school are: 'Students seem to value co-operation', 'It seems that students are co-operating with each other', 'Students seem to share the feeling that co-operating with each other is important'. Likewise, to measure how competition is perceived by students, they questioned how true (not at all true, slightly true, very true and extremely true) the following things about their school are: 'Students seem to value competition', 'It seems that students are competing with each other', 'Students seem to share the feeling that competing with each other is important', and 'Students feel that they are being compared with others'. Survey results demonstrate that co-operation amongst 15-year-old students is more valued that student competition. On average across 15 worst performing nations, 43% of students reported it is very true that their groupmates co-operate with each other, while approximately 39% of pupils conveyed same about competing with each other.

Therefore, parental involvement Index also has been created by asking students to report their attitudes for the following statements: 'My Parents support me when I face difficulties', 'My parents encourage me to be confident', and 'My parents support my educational efforts'. On average, 41% of students considered that their parents are very supportive when they face difficulties in doing school tasks.

Empirical Results And Discussion:

Correlation analysis indicates a positive and significant correlation between disciplinary climate and the students' scores on the international test of Cognitive skills and knowledge (Table 1). A correlation between Parental involvement and assessment outcomes is also positive and significant. It

is also observed that the correlation between truancy index and test outcome is negative and significant. The analysis of the correlation between the school community indicators and educational outcomes provided results similar to those presented above. Stronger the students are against bullying, the higher the test outcomes as we get same relationship obtained in correlation matrix. As teachers provide less feedback to their students, it might result in lower learning outcomes among students.

Table 1. Correlation matrix

	Cognit~t	Discip~x	Bullyi~x	Truanc~x	T~mIndex	T~tIndex	T~kIndex	Compet~x	Cooper~x	Parent~x
CognitiveA~t	1.0000									
Discipline~x	0.1600	1.0000								
BullyingIn~x	0.3163	0.0242	1.0000							
TruancyIndex	-0.0911	-0.0649	-0.0071	1.0000						
TeacherEnt~x	0.0133	0.2466	0.1086	-0.0672	1.0000					
TeacherSup~x	0.0137	-0.1428	-0.0396	0.0416	-0.3483	1.0000				
TeacherFee~x	-0.0781	0.2047	0.0299	-0.0272	0.4135	-0.3332	1.0000			
Competitio~x	0.0419	-0.0008	0.1728	-0.0001	0.1057	-0.0573	0.1129	1.0000		
Cooperatio~x	0.0673	0.2176	0.2606	-0.0508	0.2625	-0.1959	0.2521	0.2598	1.0000	
ParentInvo~x	0.1562	0.1173	0.2780	-0.0539	0.2136	-0.1216	0.1363	0.2110	0.2910	1.0000

Therefore, correlation matrix demonstrated that there is no multicollinearity issue in the analysis. This can also be proved by estimating VIF values (variance-inflating factor) below:

Variable	VIF	1/VIF
TeacherEnt~x	1.37	0.730953
TeacherFee~x	1.31	0.762438
Cooperatio~x	1.30	0.770163
TeacherSup~x	1.21	0.828283
ParentInvo~x	1.19	0.837221
BullyingIn~x	1.14	0.875458
Discipline~x	1.12	0.896423
Competitio~x	1.11	0.898610
TruancyIndex	1.01	0.990479
Mean VIF	1.20	

VIF measure shows the degree of variance of OLS estimator due to multicollinearity. There is no an issue of multicollinearity as VIF index is less than 10.

Therefore, Shapiro-Wilk test carried out to check for normality of residuals for assuring valid p-values for the t-tests and F-tests. The p-value is very small, indicating that we cannot accept that residuals are normally distributed.

Table 2. Shapiro–Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
res	64,724	0.97951	459.060	17.071	0.00000

Note: The normal approximation to the sampling distribution of W' is valid for 4<=n<=2000.

To handle this issue, OLS coefficients were estimated based on robust, corrected, unbiased standard errors.

Therefore, the Breusch-Pagan test and graphical approach for heteroskedasticity was performed. Obtained p-value is more than 0.05, indicating that we cannot reject null hypothesis which assumes homoskedasticity is considered to be present.

Table 2. Test for heteroscedasticity

```
Breusch-Pagan/Cook-Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of CognitiveAchievement

H0: Constant variance

    chi2(1) =   1.08
Prob > chi2 = 0.2979
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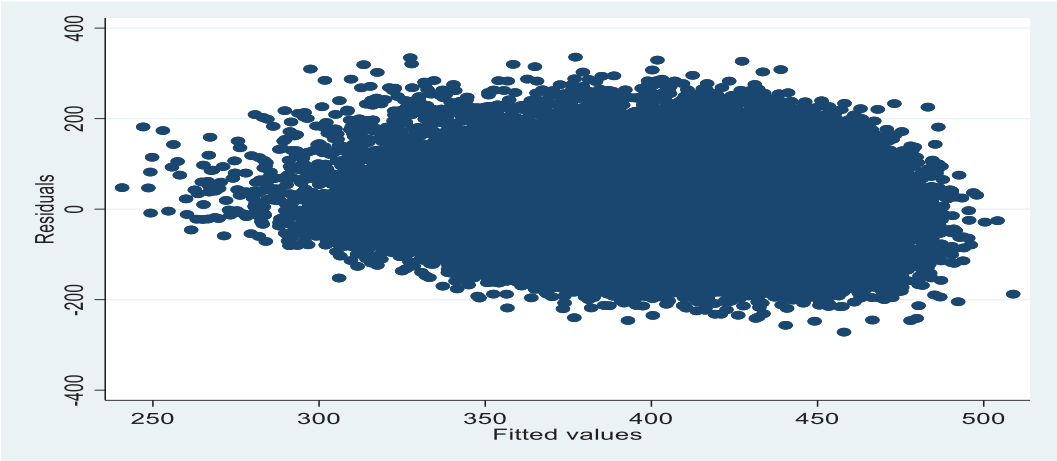

Graph 1. Plot for Heteroscedasticity

However, we can see that pattern of the data points is getting a wider towards the right end, which is indication of heteroscedasticity. To get rid of this violation, it is decided to get natural logarithm of dependent variable in regression analysis.

Table 3. OLS results

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Linear regression                               Number of obs     =     53,953
                                                F(9, 53943)       =    1079.28
                                                Prob > F          =     0.0000
                                                R-squared         =     0.1601
                                                Root MSE          =     .20122
```

lnY	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
DisciplineIndex	.0118086	.0002748	42.96	0.000	.0112699	.0123473
BullyingIndex	.0177906	.0002449	72.64	0.000	.0173105	.0182707
TruancyIndex	-.0221279	.0011159	-19.83	0.000	-.024315	-.0199407
TeacherEnthusiasmIndex	-.0017699	.0004002	-4.42	0.000	-.0025543	-.0009855
TeacherSupportIndex	.0005708	.0003557	1.60	0.109	-.0001263	.0012679
TeacherFeedbackIndex	-.010281	.0004169	-24.66	0.000	-.0110981	-.0094639
CompetitionIndex	-.0004302	.0003164	-1.36	0.174	-.0010503	.00019
CooperationIndex	-.0029959	.0003408	-8.79	0.000	-.003664	-.0023279
ParentInvolvementIndex	.0089188	.0004425	20.15	0.000	.0080515	.0097862
_cons	5.612137	.0087298	642.87	0.000	5.595026	5.629247

The first thing that derived reader's attention is low R square value, showing 16% variations in students' test scores can be explained by existing school climate in every school system. It is true, there are other important factors affecting students' achievements like resources of the school, socio-economic background and well-being of learners, and non-school factors. Explaining 16% of variations in student's performance, school climate can be considered as a powerful dimension encouraging pupils to study well.

On average across 15 worst performing countries at PISA 2018, every unit increase in the index of disciplinary climate was associated with an increase of 1.1 score points in Cognitive skills of 15-year-old student. It can be concluded that students who counted that disciplinary issues occur in classes scored lower that those students who jot down that these kinds of problems never or hardly ever happen during class time. Concerning to truancy index, there is 2.2 points decrease in student's achievement as a student skip one whole day of school, with a significant coefficient. In the schools of Brazil, Panama, Saudi Arabia, the Dominican Republic, Georgia and Kazakhstan more than half of pupils had skipped a whole day of school before taking PISA 2018 assessment. It implies, large proportions of pupils in those nations had missed learning opportunity which lead to negative consequences in their achievements. Estimation outcomes also reveals that the stronger the students against bullying was associated with an increase of 1.7 score points with a significant coefficient.

Interactions between students and their teachers play a crucial role in pupils' learning career. However, one unit increase in teacher enthusiasm was associated with a decline of 0.1 score points, even though 32% of students (Appendix 2) considered their teachers care about them and like teaching them. The same is true for teacher feedback index coefficients. On the other hand, teacher support index has a positive impact on student test scores with insignificant coefficients. Still, in every school teachers should encourage students by helping them while setting goals, rules, treating each student fairly and equally. Concerning to school community dimension, there is no significant association between competition and Cognitive Achievements of students. A negative association with cognitive outcomes was observed when students strongly highlighted the importance of cooperation with each other and underperformed slightly by 0,02 points – the students who counted cooperation is not so crucial in their studies. Nevertheless, OLS estimation coefficients are not in the same line with the expectation that competition and cooperation are strongly associated with high students' achievements among 15-year-old students in developing nations. While parental involvement in school-related occasions is weakly related to cognitive assessment outcomes, statistically, a one-unit increase in parental involvement resulted in 0.08 unit increase in test scores. Indeed, the average score in cognitive skills was higher in those nations where parents were involved in their kid's progress.

Conclusion:

The concept of education quality has gained a growing attention in development policies, especially in developing nations. Majority of pupils leave schools without having required knowledge and competencies corresponding to their educational level. Thus, offering a high-quality schooling has become an objective targeted by developing countries. Achieving such a goal necessitates an in-depth diagnosis of the factors effecting and explaining education quality. Number of theoretical and empirical studies have been developed in this direction. This study matches the existing literature by examining the impact of school climate quality on education quality. The literature review explored the potential dimensions of school culture through which this effect is possible. The empirical analysis a sample of 15 worst performing nations including more than 120 000 students attending in PISA 2018. The main outcomes obtained using OLS shows that school climate has a strong association with student achievement in Cognitive Assessment. With respect to the role of dimensions of school climate, the results confirm that safety school environment enables teachers to deliver classes efficiently, in turn, enhance students' learning outcomes. The analysis of the effect of each indicator of school climate on educational outcomes demonstrated the importance of enhancing school culture, in particular, disciplinary climate, bullying, truancy, teacher enthusiasm and parental involvement in school-related activities, as tools for promoting high learning outcomes in a nation.

However, the limitation of the study is that the coefficients of Equation (1) was estimated using ordinary least squares (OLS) estimator, thus it has endogeneity issue. This problem results from unobservable values or omitted variables that have direct effect on the dependent variable and other explanatory variables. The endogeneity problem can also raise from causality between two regressors. To overcome this issue, 2SLS or GMM model should be employed to assess the robustness of the outcomes in the future studies.

Therefore, current study follows the educational outcomes to analyze education quality. However, this measurement has a number of limitations. Teaching and learning outcomes are composite and very challenging to observe over time, by streamlining learning outcomes, nations may lose other important component of what matters in schooling. For instance, how can we support the research outcome that schools with high scores in PISA survey is not efficient in reducing the number of out-off school students? Or another research result that secondary schools with low assessment outcomes are able to positively affect their students' behavior – leading to higher attendance and satisfaction rates of students. So, we can conclude that, test outcomes are not perfect measures of school quality as student academic achievement establishes only one single factor of decent school. Besides that, the structure and level of tests may not always cover the curriculum in a nation. To handle this issue, it is also proposed to employ student well-being and satisfaction as dependent variables in the model.

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Appendix 1. List of 15 worst performing nations at PISA 2018

Country Identifier	Freq.	Percent	Cum.
Baku (Azerbaijan)	6,827	5.60	5.60
Argentina	11,975	9.82	15.41
Bosnia and Herzegovina	6,476	5.31	20.72
Brazil	10,687	8.76	29.48
Dominican Republic	5,636	4.62	34.10
Georgia	5,567	4.56	38.67
Indonesia	12,095	9.92	48.58
Kosovo	5,058	4.15	52.73
Kazakhstan	19,507	15.99	68.72
Lebanon	5,614	4.60	73.32
Morocco	6,814	5.59	78.91
Panama	6,270	5.14	84.05
Peru	6,086	4.99	89.04
Philippines	7,233	5.93	94.97
Saudi Arabia	6,136	5.03	100.00
Total	121,981	100.00	

Appendix 2. Teacher Enthusiasm

TeacherEnthusiasmIndex	Freq.	Percent	Cum.
4	3,618	3.34	3.34
5	795	0.73	4.08
6	1,372	1.27	5.34
7	1,564	1.44	6.79
8	4,315	3.99	10.77
9	4,099	3.79	14.56
10	7,657	7.07	21.63
11	10,377	9.59	31.22
12	32,682	30.19	61.41
13	11,953	11.04	72.45
14	9,615	8.88	81.33
15	6,454	5.96	87.29
16	13,755	12.71	100.00
Total	108,256	100.00	