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How Leadership, School Culture, Collective Efficacy, Academic Self-Efficacy, and Socioeconomic Status Affect Student Achievement

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Abstract

The purpose of this study is to investigate the impact of instructional leadership and school culture in school-level, and academic self-efficacy and socioeconomic status in student-level on academic achievement. The study conducted with 194 teachers and 948 students at 30 schools in Çankırı province. The sample was composed of stratified sampling technique considering the number of teachers and students in schools. In the 2017-2018 academic year, teachers responded to the Organizational Culture Scale, Instructional Leadership Scale, and Collective Teacher Efficacy Scale. Additionally, students responded to the Academic Self-Efficacy Scale. For academic achievement, we used students' averages scores related to six courses. We checked five hypotheses in the study and analyzed them with two-level structural equation modeling. The findings showed that socioeconomic status, academic self-efficacy, and collective efficacy of teachers had a significant effect on the students' average academic achievement scores. Another result indicated that perceptions of teachers about school principals' instructional leadership had a significant effect on organizational culture perceptions. Moreover, perceptions of the organizational culture of teachers had a significant effect on their perception of collective efficacy.

Keywords

Efficacy
Instructional leadership
School culture
Socioeconomic status
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Introduction

Policy makers, researchers, and practitioners focus on factors affecting student success to provide equal educational opportunities for students. Studies on academic achievement revealed that variables such as students' socioeconomic status -SES- (Konstantopoulos, Li, Miller, & Van der Ploeg, 2017), self-efficacy (Yabaş & Altun, 2009) leadership skills of school administrators (Hallinger, 2005; Ozdemir, 2019; Sebastian & Allensworth, 2012) school climate (Chen & Weikart, 2008) and teacher self-efficacy (Tschannen-Moran & Barr, 2004) had an impact on the academic success. These studies have shown that variables at the student-level and school level affect the academic success of the student directly or indirectly. Although there are many studies that modelled student-level and school-level variables together to examine student achievement (e.g., Shin, Lee, & Kim, 2009; Stewart, 2008), we have not seen any studies in which variables SED and students' academic self-efficacy perceptions at student-level and school culture and teachers' collective efficacy and school principals' instructional leadership were examined and modeled together. The current study modelled the relationship between the principal's instructional leadership behaviors and student academic achievement through school culture and teachers' collective efficacy. Additionally, this study revealed the direct effect of SED and students' self-efficacy perceptions on students' academic achievement. In this respect, the current paper is expected to provide data for the development of policies to improve academic achievement in developing countries such as Turkey. It has emerged that students' academic achievement is lower in international trend researches such as PISA, TIMMS, PIRLS, especially in developing countries than western countries. In this context, it is frequently emphasized that research results conducted in developing countries for variables that affect student success are needed (Hallinger, 2011). Although this study was conducted locally in Turkey, the impact is expected to be at the international level. The study results are expected to contribute to policy makers, researchers and practitioners in the development and implementation of national and international policies to reduce inequality among students in the context of academic achievement.

Turkey Context

Both national and international academic achievement test results showed that the performance of Turkish students is quite low. In Turkey, the transition from lower secondary to upper secondary education and upper secondary education to higher education is done on a national scale and using national level examinations. Transition to Secondary School Exam (TSSE[LGS]) has been carried out by Ministry of National Education (MoNE), and each year, on average, over a million students attend this exam. In LGS 2018, 72 thousand students had zero points in Math test while approximately one thousand students had zero points in Turkish test (Ministry of National Education [MoNE], 2018a). Similarly, two million and 260 thousand students attended to Higher Education Exam (HEE [YKS]) carried out by the Student Selection and Placement Centre (SSPC [OSYM]), about one-fourth of these students failed in the Basic Proficiency Test (BPT [TYT]). Again, in this exam, 41 thousand candidates had zero points (OSYM, 2018). According to the Program for International Student Assessment (PISA) 2015 results, Turkey was below the average of the Organization for Economic Co-operation and Development (OECD) by ranking 50th among 72 countries (OECD, 2016a). All indicators point out that Turkish education system is far from achieving educational objectives.

This low performance displayed by students in primary fields causes a big disappointment in the Turkish public. MoNE employs approximately one million teachers and offers education in over fifty thousand schools (MoNE, 2018b). Therefore, MoNE has an over-centralized-bureaucratic organizational design. The low academic performance of a considerable portion of the students who are the outputs of such an education system, at the same time leads more severe results to the detriment of the disadvantaged social groups in the country (Dinçer & Kolaşin, 2009; ERG, 2008). According to the data of Turkish Statistical Institute (TURKSTAT) (2016), income inequality in Turkey has been gradually increasing. One of the essential reasons for that is the inefficiencies in social inclusion (Balaban, 2014). Due to the lack of equality in opportunity in education, academic performance decreased among students with low socioeconomic background (Gelbal, 2008).

Theoretical framework

There are various reasons for the academic failure of the students. In the literature, previous researchers gathered them into three groups: student, school resources, and teaching and management processes in the school (OECD, 2005; Sarıer, 2016). Among the variables that play a role in academic achievement of students revealed from socioeconomic status (SES) (Coleman et al., 1966; Gelbal, 2008; Ozdemir, 2019). In addition, it is stated that variables such as students 'motivation (Doğru & Ünlü, 2012), their academic self-efficacy perceptions (Güzel, 2017; Saunders, Davis, Williams, & Williams, 2004), their families' support (Gonida & Cortina, 2014), peer learning (Slavin, 1988) are also determinative.

Student resources factors have an important place as well as factors within the school in academic achievement. Leadership behaviors of school principals (Gentilucci & Muto, 2007; Ozdemir, 2019; Sebastian & Allensworth, 2012), supportive and encouraging learning culture (Freiberg, 1999; Sergiovanni, 2001), teachers' perceptions of collective efficacy (Goddard, 2001; Goddard, Hoy, & Hoy, 2000), teacher quality (Darling-Hammond, 2000), the technological infrastructure of the school (Lei & Zhao, 2007) and the effectiveness of the school (Hallinger & Heck, 1998) are some of the main factors affecting student academic success.

In this study, we classified variables affecting student achievement under two levels as (i) student and (ii) school. A theoretical model is developed to be tested, considering that student-level variables directly affect student achievement. While some school-level variables (instructional leadership and school culture) affect student achievement indirectly, some variables affect it directly. Bossert, Dwyer, Rowan, and Lee (1982) modeled the role of principals on student achievement, and they indicated that the school principals impacted student achievement via school-level variables. Figure 1 shows the initial model for this study.

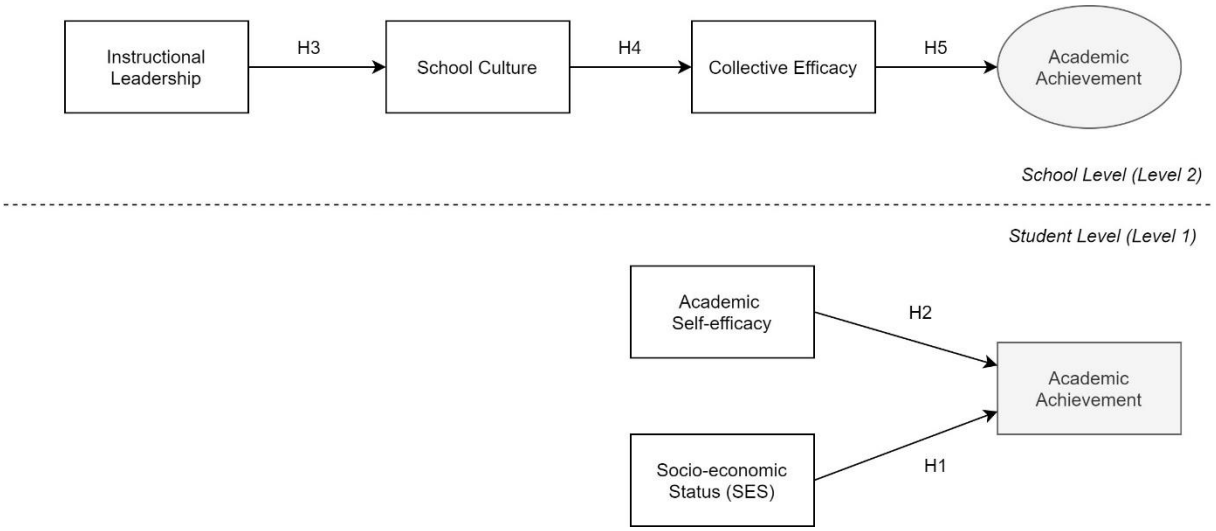


Figure 1. Framework for Analysis

According to the model in Figure 1, we discussed student achievement at two levels as student-level and between schools. In level 1, to explain the difference in achievement among students, the variables of SES and academic self-efficacy were added to the model. At level 2, to examine the differences in achievement among schools, instructional leadership behaviors of the principal, school culture, and collective efficacy were included. In this part, we explained the variables related to the model respectively.

Student Level Variables

Socio-Economic Status

SES is a concept related to the social standing or class of an individual or a group, usually measured as a combination of education, income, and profession. This variable includes not only the economic gains of individuals but also their access to education, social security, opportunities, and

privileges provided to people and quality of life. Thus, SES is a commonly used concept in all behavioral and social sciences based on research and practice (American Psycological Association [APA], 2019). Indeed, the Heyneman and Loxley effect (H / L effect) states that the impact of the SES factor on student academic achievement is higher in developing countries than in developed countries (Heyneman & Loxley, 1983).

Many studies have been conducted concerning the relationship between SES and education (Brown, Wohn, & Ellison, 2016; Buckingham, Wheldall, & Beaman-Wheldall, 2013; Hanushek, 1997; Sirin, 2005) and significant relations were found between these two variables. In a study conducted by Morgan, Farkas, Hillemeier, and Maczuga (2009), the academic skills of children of families with low SES were found to be less than the children of families with high SES. Once again, a study conducted by Aikens and Barbarin (2008) showed that children of families with low SES had problems in terms of cognitive development, language, memory, and emotion, and children of these families had low income in their future lives and health-related problems. Additionally, for children of families with low socio-economic status were malnourished, their academic development was slower and their future education life was negatively affected (Behrman, 1996). Inadequate education, increasing of drop-out and malnutrition of children, on the one hand, reduced the academic success of the student, on the other hand, affected the welfare of the society negatively. (Abotsi, Yaganumah, & Obeng, 2018). For instance, the results of the PISA 2015 displayed that students with high SES had higher points compared to their peers with low SES (OECD, 2016b). In another research, Ozdemir (2019) found that SES of students had a significant impact on academic achievement. In this direction, first hypothesis of the research is as follows:

H1. As the students' SES increases, their academic achievement score also increases.

Academic Self-Efficacy

Academic self-efficacy is the belief that students can accomplish any academic task by positively influencing their behavior at specified levels (Bandura, 1997; Schunk, 1991). Academic self-efficacy is closely related to the students' learning speed, cognitive participation, analytical thinking skills, susceptibility to positive or negative emotions, and academic strategies they use while studying (Linnenbrink & Pintrich, 2003). Academic self-efficacy perception of students plays a vital role in controlling their education process and its results and determining how individual emotions and thoughts motivate them (Bandura, 1986). Students with high academic efficacy, believe in themselves in understanding a lesson, solving education problems, and selecting the most difficult lessons (Zimmerman, Bandura, & Martinez-Pons, 1992). Bandura (1993) found that students with high academic self-efficacy were more successful in performing complex tasks, problem-solving and extracurricular activities than students with low academic self-efficacy. Academic self-efficacy was a concept about students' beliefs about their personal efficacy and how they would react to any task that needed to be done. The perception of a student in his/her performance was related to strategies to use in achieving the duty, how much effort to make, how to act in the face of obstacles are strong determinants of behaviors because they affect the thinking processes that increase or prevent student achievement (Maier & Curtin, 2005). Thus, academic self-efficacy was a significant predictor of student achievement in various academic situations (Pajares, 1996). Studies displayed that self-efficacy belief was useful in the academic life of students at all levels (Choi, 2005; Yılmaz, Gürçay, & Ekici, 2007). For instance, Lent, Brown, and Larkin (1984) found that students with high academic achievement had firm beliefs that they could get high grades in the exam. In another study, Jinks and Morgan (1999) found that there was a significant relationship between self-efficacy perception and student scores of primary school students and these relationships were the same in urban and rural schools. In this study, we discussed the concept of academic self-efficacy with the dimensions of talent, environment, and effort. The second hypothesis of the research is as follows:

H2. The higher the perceptions of academic self-efficacy of students, the higher their academic achievement scores.

School Level Variables

Instructional Leadership

Instructional leadership includes the emotional, mental, physical and social development of students, the professional progress of teachers and all of the actions carried out to be more effective in the school's relations among school actors and with the environment (Elmore, 2005; Mulford & Silins, 2003). The focus of instructional leadership was that school administrators should coordinate, control, supervise, and improve curriculum and teaching in the school (Hallinger, 2003). School principals had roles in line with the objectives of the school academically and socially, such as creating a favorable environment for teaching and learning (Robinson, Lloyd, & Rowe, 2008), improving academic achievement of students (Hallinger, 2003) and creating a high academic environment by setting high academic expectations and standards between students and teachers (Mortimore, 1993). Hallinger (2005) described an active school principal as the person who could balance political, managerial and educational roles. In this term, school principals as an instructional leader should focus on coordinating and developing the curriculum in their schools and should create an appropriate teaching environment.

We put two basic models in the study, examining the school leadership behaviors of principals effective on students' academic achievement at the school level. In the direct impact model based on the assumption that school principals directly affect the academic performance of students, we focused on measuring the impact of school principals on school outcomes by holding other variables affecting academic achievement of students fixed (Edmonds, 1979). On the other hand, school principals did not have direct impact on the academic achievement of students, but they created learning and teaching culture in the school by exhibiting instructional leadership behaviors and mediated the improvement of academic achievement of students (Hallinger & Heck, 1998). Likewise, in most of the studies on leadership in educational organizations, it was revealed that school principals were responsible for creating common teaching and learning culture in every school and if there was no learning culture within the organization, academic achievement of students might decrease (Fink & Resnick, 2001). Witziers, Bosker, and Kruger (2003) also emphasized that school principals did not have a direct impact on learning outcomes, and since school principals affected the organizational structure and school culture, they had an indirect effect on learning outcomes. There is evidence that school administrators' leadership styles also have an impact on the collective efficacy of teachers, which is the another variable contributing to student success (Goddard, 2001).

One of the essential responsibilities of the school principal was to increase the motivation of the teachers and build the school culture as a learning environment to enhance the academic achievement of the students. Reavis, Vinson, and Fox (1999) found that the changes made in the school culture by a new school principal in a poorly performing high school had a positive effect on the achievement of students. On the other hand, Boyer (1983) emphasized that the school principal always made a difference in the schools where achievement was high, communication was open, and there was a sense of community. As a result, we found that the leadership style strongly influenced the relationships that shape the culture of the school. In this respect, the third hypothesis of the research is as follows:

H3. According to teacher perceptions, instructional leadership behaviors of school principal have an impact on school culture.

School Culture

The concept of "organizational culture" in the literature of management that focused on organizational performance, productivity, managerial effectiveness, and organizational behavior changed into the term of "school culture" in the literature of educational administration. Hopkins, Ainscow, and West (1994) defined corporate culture as observable patterns of behavior, norms, values, philosophy, unwritten policies, and procedures. Deal and Peterson (1990) described the school culture as a pattern of values, beliefs, and traditions produced throughout the history of the school. Heckman (1993) emphasized that school culture expressed a sequence of shared values that directed the actions of teachers, students, and administrators. Stolp and Smith (1995), on the other hand, defined school culture as a set of meanings that included historically transferred norms, values, beliefs, traditions and myths, although they were perceived differently by school members. Although previous researchers

gave different definitions, it was possible to state that the concept of school culture formulated by various researchers included components such as norms, values, beliefs, rituals, ceremonies, symbols, and stories. In other words, previous researchers defined school culture as the total of traditions, values, and beliefs that shaped the behavior of school actors such as principals, teachers, and students (Deal & Peterson, 1999; Gaziel, 1997; Heckman, 1993).

Goddard et al. (2000) stated that the beliefs and attitudes of teachers interacted with the social environment of the school. Apart from the teachers' efficacy, the factors such as the culture of the school where they worked and the skills of other teachers shaped their ideas and opinions. According to the social cognitive theory, the culture of the school where a teacher worked affected their abilities as individuals and their combined strengths in educating students (Goddard, 2001). If the school culture offered supportive and collaborative environments, collaboration among teachers, reflective dialogue and sharing responsibility would increase, in this case it would reflect positively on the collective efficacy of teachers. The results of the studies also provided strong evidence that there was a relationship between school culture and collective efficacy perception (Ross, Hogaboam-Gray, & Gray, 2004; MacNeil, Prater, & Busch, 2009). In this direction, the fourth hypothesis of the research is as follows:

H4. According to teacher perceptions, school culture affects collective teacher efficacy.

Collective Teacher Efficacy

The concept of collective teacher's efficacy emerged as a result of widening Bandura's (1997) self-efficacy perception defined as "beliefs about what an individual can do in certain situations," discussed within the framework of Social Cognitive Theory, at the group level.

Bandura (1997) defines collective efficacy as shared beliefs of a group on having success, considering how will organize the actions and efforts to achieve a job and manage it. Seeing that the school is an open social system, teachers are expected to work with their colleagues instead of working alone in this system. For this reason, when we mention about collective teacher efficacy, we mean the common beliefs that teachers can effectively manage their actions and efforts in order to increase students' performance, achieve learning goals, and carry out educational processes more effectively (Goddard et al., 2000). As stated at the beginning, collective teacher efficacy emphasizes the performance and capacity of a group, unlike teacher self-efficacy, and indicates a common belief for success (Goddard, et al., 2000; Ross & Gray, 2006).

When we examine collective teacher efficacy studies, we see that the focus is on relationships with variables such as school climate (Lim & Eo, 2014), and teacher in-group communication (Ross et al., 2004). In Ross and Gray's (2006) study, collective teacher efficacy was the mediator variable in the relationship between the leadership behaviors of the school administrator and teachers' commitment. Many studies have been conducted on the relationship between collective teacher efficacy and student achievement, and they expressed that there are positive significant relationships between collective teacher efficacy and student achievement (Bandura, 1993; Goddard, 2001; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Another result of the studies is that one of the important variables affecting the differences in student achievement between schools is collective teacher efficacy (Caprara, Barbaranelli, Borgogni, & Steca, 2003; Goddard, 2001; Goddard, Hoy, &Hoy, 2004; Hoy, Sweetland, & Smith, 2002; Tschannen-Moran & Barr, 2004). Tschannen-Moran and Barr (2004) went one step further in their research and reached the conclusion that the effect of collective teacher efficacy on student academic achievement is more than that of student's socioeconomic level variable. In the study conducted by Bandura (1993), if researchers take under control the factors: the physical characteristics of the students, the individual characteristics of the teachers, and the previous achievement of the school, they found that schools with high perceived collective efficacy have higher points in national examinations. Armstrong-Coppins (2003) showed that school administrators affect collective efficacy in two ways. While school administrators directly affected leadership behaviors and collective efficacy, they also indirectly affected the school culture with intentional or unintentional interventions. In this respect, the fifth hypothesis of the research is as follows:

H5. As teachers' collective efficacy increases, student achievement also increases.

Method

Sample

The population of the research consisted of 40 secondary schools in 8 districts of Çankırı (Central, Çerkeş, Eldivan, Kızılırmak, Ilgaz, Kurşunlu, Orta ve Şabanözü) and 622 teachers working in the fields of six courses: Turkish; Mathematics; Science; Revolution History and Kemalism; English and Religious Culture and Moral Knowledge, and a total of 1924 students in 8th grade. In selecting the sample of the study, we used stratified sampling considering the number of teachers and students in schools. We selected schools with the highest number of students and teachers in the sample. Since this study examines the academic success of 8th grade students, teachers who entered these classes were taken into consideration in the sample selection of teachers. In this case, the sample of the research was of 30 schools, 194 teachers, and 948 students in Çankırı province. Table 1 presents the number of sample.

Table 1. Descriptive Statistics of Sample

	Central	Çerkeş	Eldivan	Ilgaz	Kızılırmak	Kurşunlu	Orta	Şabanözü	Total
Number of schools									
All (*N*)	18 (45%)	5 (13%)	1 (3%)	4 (10%)	3 (8%)	3 (8%)	3 (8%)	3 (8%)	40 (100%)
Sample (*n*)	13 (43%)	4 (13%)	1 (3%)	4 (13%)	1 (3%)	3 (10%)	2 (7%)	2 (7%)	30 (100%)
Number of teachers									
All (*N*)	395 (64%)	48 (8%)	11 (2%)	53 (9%)	23 (4%)	39 (6%)	15 (2%)	38 (6%)	622 (100%)
Sample (*n*)	99 (51%)	19 (10%)	5 (3%)	23 (12%)	7 (4%)	18 (9%)	13 (7%)	10 (5%)	194 (100%)
Number of students									
All (*N*)	1293 (67%)	150 (8%)	35 (2%)	116 (6%)	63 (3%)	76 (4%)	75 (4%)	116 (6%)	1924 (100%)
Sample (*n*)	535 (56%)	100 (11%)	29 (3%)	69 (7%)	40 (4%)	59 (6%)	53 (6%)	63 (7%)	948 (100%)
Students' gender									
Female (*n*)	291	43	16	30	19	24	30	39	492
Male (*n*)	244	57	13	39	21	35	23	24	456
Students' scores									
Mean	76.7	80.0	66.7	80.6	71.4	72.4	75.1	75.3	76.4
Min-Max	21.6-99.7	33.6-99.4	41.2-94.4	46.7-100	43.0-100	38.6-95.8	43.8-99.0	43.8-98.6	21.6-100
SD	14.8	15.6	15.0	15.5	17.7	16.8	13.9	14.8	15.4

Instruments

To collect the data, we applied the Organizational Culture Scale (OCS), Instructional Leadership Scale (ELS), and Collective Teacher Efficacy Scale (CTS) to teachers and Academic Self-Efficacy Scale (ASES) to the students. We also used students' academic scores of six courses as data. The scores for these courses were asked from the students in their personal information form.

The socio-economic status (SES)

We calculated the monthly income, educational background of the mother, and the educational background of father variables to get SES data. Therefore, first of all, exploratory factor analysis (EFA)

was used to determine how three of the variables, such as monthly income of students, educational background of mother, and educational background of father explains SES. As a result of the factor analysis, we found that all three variables explain 62% (total variance explained) of SES. The coefficients obtained from all three variables were multiplied by the variables and divided by the Eigenvalue. The equation used in the calculation of SES was as followed.

SES = .807* educational background of mother + .827* educational background of father+ .728*income/1.864

Academic Self-Efficacy Scale (ASES)

ASES, developed by Jinks ve Morgan (1999) and adapted into Turkish by Öncü (2012), was used to measure perceptions of academic self-efficacy of students. Confirmatory factor analysis was used in the adaptation to Turkish study conducted by Öncü (2012). Öncü (2012) was used confirmatory and exploratory factor analysis in the adaptation to Turkish. As a result of the exploratory factor analysis, KMO coefficient was found to be significant at .83, Barlett Test result at x^2 = 927.03, *sd* = 186 and p <.000. In the adaptation of the scale to Turkish, it was observed that the reliability level of the scale was ".80" and the reliability coefficients of the dimensions varied between .81 and .51. ASES consisted of three dimensions -*skills, learning environment, quality of teaching*, and 19 items, such as ability, environment, and quality of education. It was a five-point Likert scale and valued among 'I strongly disagree' and 'I strongly agree.' Among the scale items, there were expressions such as 'I work hard at school' and 'I could get better grades if my teacher liked me more.' In the reliability analysis, we found Cronbach Alpha as .71. We also did the Confirmatory Factor Analysis (CFA) and found to be equal and close to the cut points (x^2 = 376.64, *df* = 149, *p* > .05, RMSEA = .07, NNFI = .92, and CFI = .93). The fit model indicated that the scale had good fit indices.

Instructional Leadership Scale (ILS)

To measure the instructional leadership levels of school principals according to teacher perceptions, we used ILS developed by Alig-Mielcarek (2003) and adapted into Turkish by Şahin (2011b). EFA was performed by Şahin (2011b) during the adaptation of the scale to Turkish. As a result of the exploratory factor analysis, KMO coefficient was found to be 916, Barlett Test result was found to be significant at x^2 = 2219.34, *sd* = 253 and p <.000. In the adaptation of the scale to Turkish, it was observed that the reliability level of the scale was ".94", and the reliability coefficients of the dimensions ranged from .81 to .87.The scale consisted of three dimensions -*providing professional development in a school, introducing shared goals, giving feedback during learning, teaching process*, and 23 items as providing professional development throughout the school, identifying, shared goals, and providing and controlling feedback to the teaching and learning process. The scale was five-point Likert type and rated among 'I strongly disagree' and 'I fully agree' The scale items include expressions such as 'Our school principal provides useful professional tools and resources for teachers' and 'Our school principal informs teachers about the academic goals of the school.' In the reliability analysis, we calculated Cronbach Alpha as .95. In the confirmatory factor analysis of the scale, the values were found equal and close to the cut points (x^2 = 581.06, *df* = 227, *p* > .05, SRMR = .04, NFI = .96, NNFI = .98, and CFI = .98). The fit model indicated that the scale had good fit indices.

Organizational Culture Scale (OCS)

To measure the perceptions of the organizational culture of teachers in the United States and Turkey, the Organizational Culture Scale (OCS) was developed by Şahin (2011a). The scale was first developed in English by Şahin then adapted into Turkish. After the scale was adapted to Turkish, EFA was performed by Şahin (2011a) to test the suitability of the factor structure. As a result of the analysis, KMO coefficient was found to be 916, Barlett test result was found to be significant at x^2 = 3448.51, *sd* = 666 and p <.000. In the scale development study, it was observed that the reliability level of the scale was ".93", and the reliability coefficients of the dimensions varied between .91 and .72. The OCS consists of totally 37 items and five dimensions as *school leadership, collegiality (personal support), teacher cooperation, development culture, and teaching culture*. OCS is a five-point Likert type and has values between 'I strongly disagree' and 'I strongly agree.' The items of the scale included statements such as 'Teachers learn from each other in our school' and 'All stakeholders share the common vision about the future of the school.' We also did the validity and reliability study of the OCS. In the reliability analysis, we analyzed Cronbach Alpha value as .97. In addition, the scale results were calculated as equal and close to the cut points (x^2 = 1502.67, *df* = 619, x^2/sd value 2.42, $p > .05$, NFI = .95, NNFI = .97, CFI = .97). We found out that the fit indices of the scale were good.

Collective Teacher Efficacy Scale (CTS)

To measure perceptions of collective efficacy of teachers, the Collective Teacher Efficacy Scale, which was originally developed by Goddard et al. (2000) and adapted into Turkish by Kurt (2012), was used. EFA was used in the adaptation of the scale. The Cronbach's Alpha reliability coefficient of the scale was calculated as .80. The CTS is one-dimensional and consists of 21 items. Among the items of the scale, expressions such as 'Teachers in this school are sure that they can motivate students,' and 'Teachers in this school think that there are students in the school that no one else can reach' were taken place. We also calculated CFA and the values were found equal and close to the cut points (x^2 = 578.62, *df* = 312, $p > .05$, RMSEA = .08, CFI = .99, NFI = .97, and NNFI = .97). There was a good harmony between the data and the structure of the model suggested for the CTS scale.

Procedures and Data Analysis

We applied the scales to teachers attending Turkish, Mathematics, Science and Technology, English, Religion and Moral Knowledge and History of Revolution and Kemalism subject and to their students in Çankırı Province in the 2017-2018 academic year. Students and teachers voluntarily participated in the study. The scales distributed to teachers and students were collected by the Research and Development Unit of Çankırı Provincial Directorate of National Education. Filling out of the scales took approximately 10 minutes for a student and 20 minutes for a teacher. In this context, 948 out of 1000 scales for students and 194 out of 200 scales for teachers came back. We analysed the data via SPSS 23, Mplus 8 and Lisrel 9.30 software programs. We looked through the normality of the scales with scatter diagrams and descriptive statistics. To the results, the coefficients of kurtosis and skewness were less than ± 3, and the mean and median were close to each other (Kline, 1998).

In the study, the correlation coefficient was calculated to examine the relationships between student and school-level variables. The five hypotheses discussed in the study, and we gave them via two-level structural equation modeling. Due to the nature of social sciences, it is assumed that the student and school level variables of each school show a more homogeneous structure compared to other schools (Muthén & Muthén, 2017; Raudenbush & Bryk, 2002). Because as people interact within the group, they begin to act in a similar attitude and behavior pattern. For this reason, two-level analyzes make use of the group average. This situation is considered to be more advantageous than single-level regression results since it reduces the error rates in the regression coefficients. In addition, the fact that the students that constitute the output of the research can be grouped in the classroom and within the school shows that the data structure has a hierarchical character. Based on this information, two-level structural equation modeling was used.

Results

Firstly, to examine relationships among variables, the correlation coefficient was calculated. Table 2 indicates the results of the correlational analysis.

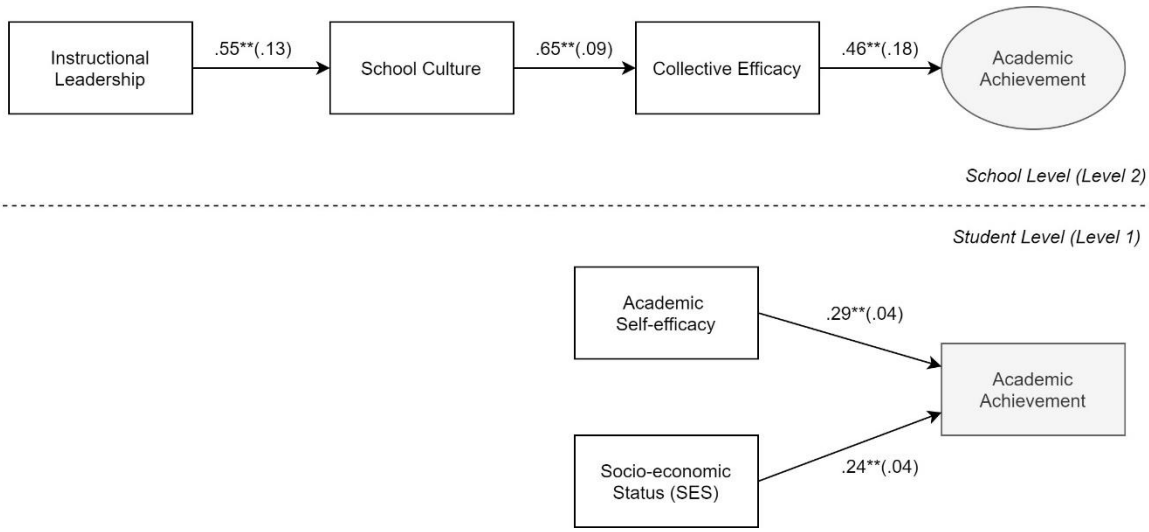
Table 2. Correlations among Variables Included in the Two-Level Structural Equation Model

	n	M	SD	1	2	3	4
Within Schools (Level 1)							
1. SES	948	3.68	1.03	-			
2. Academic self-efficacy	948	3.26	.45	.21**	-		
3. Academic achievement	948	76.40	15.40	.39**	.34**	-	
	n	M	SD	1	2	3	4
Between schools (Level 2)							
1. Instructional leadership	30	3.95	.32	-			
2. School culture	30	4.04	.25	.65**	-		
3. Collective efficacy	30	3.68	.33	.43*	.69**	-	
4. Academic achievement	30	74.57	7.99	.44*	.41*	.44*	-

**p < .01, *p < .05.

As shown in Table 2, there was a moderate, positive, and significant relationship between the academic achievement of students and their SES within schools (r = .39, p < .01). There was a moderate positive and significant relationship between academic achievement and self-efficacy of students (r = .34, p < .01). Additionally, we found a low, positive, and significant relationship between SES and academic self-efficacy of students (r = .21, p < .01). When we examined the relationship among variables between schools, we found that there was a high level of positive and significant relationship between instructional leadership behaviors of principals and school culture (r = .65, p < .01). Again, high positive and significant relationship between school culture and collective teacher efficacy (r = .69, p < .01). Along with this, we found out that a moderate, positive and significant relationship between collective teacher efficacy and academic achievement (r = .44, p < .05).

The two-level SEM was conducted to examine the five hypotheses given above. According to the results, the model acceptable fit was: x^2 = 136.72, df =58, RMSEA = .05, CFI =.98, and TLI= .93. Figure 2 presents the standardized path coefficients obtained from the analysis.



Note: *p < .05, **p < .01; standard error in parentheses.

Figure 2. Standardized Model Results

The first hypothesis was to investigate whether there was a significant relationship between the SES and academic achievement of students. As was seen in Figure 2, SES had a significant effect on average academic achievement scores. A one-unit increase in SES caused an increase of β = .24 (sh=.04, p < .01) units in the average academic achievement score of the student. The second hypothesis addressed the relationship between students' perceptions of academic self-efficacy and their academic achievement scores. To results, students' perceptions of academic self-efficacy significantly increase their achievement scores. It meant a one-unit increase in perceptions of academic self-efficacy of students increases β = .29 (sh = .04, p <. 01) units in average academic achievement point of students. The socio-economic levels and academic self-efficacy perceptions of students explained the total, 15% of academic achievement.

Concerning school-level variables, the third hypothesis investigated the impact of school principals' instructional leadership behaviors on school culture. Teachers' perceptions of instructional leadership on school principals had a statistically significant effect on their organizational culture perceptions β = .55 (sh = .13, p < .01). The fourth hypothesis examined the school culture that affected collective teacher efficacy. We observed a statistically significant effect of teachers' perceptions of instructional culture on collective teacher efficacy β = .65 (sh = .09, p < .01). Finally, we examined the fifth hypothesis of the research built on collective teacher efficacy and average student achievement. To the results, collective teacher efficacy had a significant effect on the average student achievement β = .46 (sh = .18, p < .01). In total, 54% of students' academic achievement scores were explained by the variables that were teachers' school culture perceptions, their perceptions on instructional leadership of principals and their collective efficacy. Both student level and school level models explained 17% of academic achievement of students.

Discussion, Conclusion and Suggestions

This study aimed to detect the relationship between academic achievement and student and school-level variables. A total of 194 teachers and 948 students in 30 schools in the province of Çankırı, Turkey took part in this study. For the data of the study gave a hierarchical structure, we analyzed this structure with Two-Level SEM. We also examined five hypotheses within the scope of the research. After testing the first hypothesis, we found that the SES had a significant effect on the average academic achievement point of the students. National and international studies (Aikens & Barbarin, 2008; Morgan et al., 2009) also revealed that SES was one of the most important variables affecting student achievement in education. For instance, in OECD's PISA 2015 report, it was found out that there was a direct relationship between SES and academic achievement (OECD, 2016b). In various researches conducted on the academic achievement of students in Turkey, SES was one of the most important variables that affected students' academic achievement (Gelbal, 2008; Usta & Demirtaşlı, 2018; Ozdemir, 2019; White, 1982). There were several possible explanations why SES impacted on academic achievement. For example, parents who understood the importance of education and made an effort for their children's access to education were generally from the group of parents with high level of SES. At the same time, these parents could make contact with teachers better in the school and expressed their students' needs, demands and necessities in a more quickly than the group of parents with a lower level of SES (Lightfoot, 1981). As a matter of fact, in theory, known as Heyneman and Loxley effect (H / L effect), SES was a vital factor in academic achievement in developing countries (Heyneman & Loxley, 1983). However, considering the issue in the social capital theory, the fact that parents support students 'school life both financially and psychosocially affects students' academic achievement positively. Families with high SES support their children socially, culturally and economically, facilitate their school life and help them be more successful in school life than children with lower family support (Erselcan, 2009).

As a result of the second hypothesis tested in the study, there was a significant relationship between the academic self-efficacy and academic achievement points of the students. This result corresponded to the study of Ayotola and Adedeji (2009) and Liu and Koirala (2009). In these studies, there was a significant relationship between students' self-efficacy and their academic achievement.

Besides this, Çağıran Gülten and Soytürk (2013) researched sixth-grade students, and they found out a significant relationship between students' self-efficacy and their Mathematics, Science and Technology, Turkish, Social Studies, Music and English scores. One of the main reasons why students' academic self-efficacy affected their academic achievement was that their high level of self-efficacy beliefs reflected on their motivation and behavior. As a matter of fact, in Bandura's social learning theory (1997), it was emphasized that their high self-efficacy increased their academic achievement. As discussed in this theory, it is seen that students who are aware of their abilities and believe that they will be successful can achieve their goals more easily in their school and social lives. It was also observed that students with similar beliefs who had high beliefs in achieving success were more successful than those with lower beliefs in this direction (Ormrod, 2017). Moreover, students with high self-efficacy perceptions experience less fear and anxiety. Students who overcome fear and anxiety, which is an obstacle to success, can be more successful than other students with similar skills (Hoy & Miskel, 2010).

According to another result obtained from the study based on the third hypothesis, perceptions of teachers about the instructional leadership of school principals had a significant effect on organizational culture perceptions. Bossert et al. (1982), theoretically modeling the relationship between instructional leadership and student achievement, defended that leadership had no direct effect on learning outcomes. However, they expressed that instructional leadership had an impact on students' academic achievement in an indirect way. The variable affected students' academic achievement via organizational culture, and planning and designing the teaching. In researches, recent researchers emphasized that the main issue that the school principals took into consideration while creating the school culture was that they had to know the dominant values of the organization and create a healthy learning climate (Deal & Peterson, 1999; Saphier & King, 1985). As was seen from these studies, the instructional leader might influence school culture by knowing the dominant values in the school and built a productive learning climate in the school on these dominant values.

According to the fourth hypothesis examined within the scope of the study, perceptions of the organizational culture of teachers had a significant effect on their perception of collective efficacy. As mentioned above, organizational culture shaped dominant values that create an organizational climate, and these values could help to create a productive learning environment. In this learning environment, teachers' self-confidence and their trust in their schools could increase. In other words, their self-efficacy and collective teacher efficacy levels could increase in a productive learning environment. This situation was put forward by Bandura (1997) and Kurt (2012), and they stated that positive and supportive organizational culture increased self-efficacy and collective efficacy levels of teachers. This study showed that school culture strengthened collective teacher efficacy beliefs.

Finally, when we examined the fifth hypothesis, we found that teachers' perception of collective efficacy had a significant effect on school academic achievement. This result was consistent with the past research findings (Bandura, 1993; Goddard et al., 2000). This study showed that teachers' collective efficacy belief was a vital variable to reduce the academic achievement deficits of students. Reducing the academic achievement deficits of students might be achieved due to the cooperation of teachers and their support to each other in their professional development. For example, in the study of Bandura (1993), when researcher(s) controlled the factors such as the physical characteristics of the students, the individual characteristics of the teachers, and the previous achievement of the schools, researcher(s) found that the schools with high perceived collective efficacy had higher scores in national exams. These results showed that academic achievement was high in schools with high levels of collective teacher efficacy.

This study had some limitations in some aspects. The first of these was that we used cross-sectional data in the study. It was a limitation that we did not add the previous achievements of students to the model. Further studies were suggested to be longitudinal. Secondly, next researchers might conduct qualitative approaches in the study. Therefore, they might demonstrate in-depth findings by carrying out a qualitative study with the variables affecting student achievement. Within the scope of the study, education administrators, decision-makers, education experts and teachers should take into

account the variables that affected student achievement in their studies. Notably, the disadvantaged students needed to be supported in academic terms because their SES was generally low and this variable was a vital predictor in their academic achievement in developing countries such as Turkey. Therefore, in order to develop the school culture, educational administrators should create a supportive and democratic learning climate and demonstrate leadership styles to increase the performance and skills of teachers and students. In order for training managers to develop these leadership capacities, leadership trainings can be given to them before and during their duties. However, policy makers can create real and virtual platforms that will show school administrators who demonstrate effective instructional leadership behavior to other school administrators as good examples. In this way, they can increase the knowledge and skills capacity of other school administrators about instructional leadership behaviors. In addition, policy makers can take into account school principals' capacities and skills in the selection, appointment and training processes of school administrators. Collective efficacy and teachers' self-efficacy are key variables for the student's academic achievement. In this context, education administrators should create a learning organizational culture in schools and create environments where teachers can collaborate with their colleagues by supporting their self-efficacy and collective efficacy perceptions. For example, the school administrator, who wants to achieve the high academic achievement goal set in strategic plans, can increase the self-efficacy perception of teachers while at the same time providing a culture of cooperation within the school. In addition, parents, school administrators, and teachers should support students together to improve their self-efficacy and motivation. The cooperation of these actors in collaboration can also increase student self-efficacy to a higher level.

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