

## The Factors that Affect Mathematical Achievement Among High School Students

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**Abstract:** This study was conducted to examine different factors that affect mathematical achievement among high school students in Kazakhstan. The respondents for this study were 8<sup>th</sup> and 10/11<sup>th</sup> grade students (36 girls and 22 boys). A survey was conducted by using a questionnaire for information gathering about different factors relating to mathematics achievement of students. The mathematics performance was gauged by the result of their 3<sup>rd</sup> algebra and geometry quarter grades. The findings indicate that there are positive relationships between teacher factors and student self-confidence attitude with mathematical achievement. The outcomes of correlation analysis show student's attitude is the significant predictor of mathematical achievement ( $r = 0.424$ ,  $p < .001$ ) followed by teacher support ( $r = 0.397$ ,  $p < .001$ ).

**Keywords:** mathematics achievement, quality performance, factors

### INTRODUCTION

#### Background Information

Education has a special place in the economy. A well-educated generation contributes to economic stability and creates opportunities for all citizens to succeed and find their place. Through the acquisition of knowledge, we can influence, study and develop our environment. This normalizes the search process. It has a great impact on personal and spiritual development. Learning is a continuous process, we can learn great lessons through every victory and defeat in our lives, we can discover new things by learning a lot from the people who lead us and help us. The great sage Abai, in his 17<sup>th</sup> wisdom words, said that the three of strength, mind and heart should be kept together, that is, these three elements in the path of human knowledge have a significant impact. According to other scientific work, a student begins to learn quickly if the student is directly involved in the learning process, that is, if the learner constantly moves on the way to achieve results (Bhardwaj, 2016). According to the OECD (2019\_III), the influence of the teacher on the student is huge. True professionals influence their students, ensuring that their attention is focused only on learning. In this regard, the teacher is not only responsible for the atmosphere of learning in the classroom, but also directly involved in the motivation of students. By enabling students to set the right goals for learning and to participate with them equally, this is a positive achievement for students. Another thing to note is that when the student's interest in the lesson and the teacher's motivation go hand in hand, it helps to reach new heights quickly and effectively. Based on this study, it can be seen that students who show good results become more motivated. It turns out that the student's energy and attitude to mathematics leads to success (Afzal et al., 2010). It turns out that a student's personal factors and academic success also depend on school activities. Where there is a desire for progress and continuous development, there are good opportunities for

students (Lee, 2014). There is a link between school discipline and academic achievement, disciplined schools, with a focus on learning, achieve a high level of performance (Shin et al., 2009).

### **Statement of the Problem**

The focus of this research is to identify the factors that affect mathematics education success at high school in Kazakhstan. To achieve this, a survey will be conducted in schools. Previous research has demonstrated that factors that students factors, teacher factors, parents background and schools factors have significant influence on mathematics education success at school (Demir et al., 2009). The study, conducted with 3,765 15-year-old students in 158 schools in Turkey, examined the impact of factors on student background, learning strategies, individual abilities, and the school climate. Based on this research, the parents of students have a significant influence on them, that is, they influence their future enrollment in university and finding their place. If the student has a low level of anxiety and his mathematical ability leads to mathematical success. For example, OECD states that all school climate factors are important for students' academic outcomes. The author of this study investigated the factors that have the greatest impact on students' PISA 2018 scores. Teacher and parental influence are statistically significant factors. However, the data used to assess reading, science, and mathematics performance (Akhmetov, 2021). So, in this study, we looked into the factors that influence mathematics scores. The more recent 2018 PISA data provides a useful way to explore the role that school climate might play in improving academic outcomes in Kazakhstan.

### **Purpose of the Study**

The purpose of this study is to identify the factors that affect mathematics education success at high school in Kazakhstan. Identify the factors that affect the achievement of mathematical knowledge of students by discussing and studying the impact of the above factors on the success of mathematical knowledge. As a recommendation, all of the above factors should be taken seriously in order to maximize mathematical achievement. Identify the factors that lead to a local outcome

Therefore, this study has two objectives (research questions), as follows:

1. To determine the factors that affect mathematics education success at high school.
2. To determine the largest predictor that influences the mathematical achievement of high school students.

### **Significance of the Study**

There are very few scientific studies in Kazakhstan that study the factors that affect the mathematical success of students. By studying the factors that have a high impact on this, the learning situation in schools, the training of world-class strong teachers and the impact of students' mathematical success Based on the objectives, we investigated the following hypotheses:

1. Hypothesis 1 (H1). There is a significant relationship between mathematics success at school and student self-confidence attitude.
2. Hypothesis 2 (H2). Student self-confidence attitude, teacher support and class learning environment are predictors of the mathematical achievement of high school students.

## **LITERATURE REVIEW**

Young people's enthusiasm for reading should be nurtured beginning in childhood and continuing into adulthood. The number of books a student owns is also an indicator of his or her socioeconomic status (SES). Lack of confidence can reduce the number of students who can continue their education or work in jobs that require mathematics knowledge and skills (Azina & Halimah, 2012). The influence of a child's family background on educational achievement remains significant. Children from affluent families attend better schools than children from low-income families. Parents with low socioeconomic status are less able to afford the costs of their children's higher education (Rouse & Barrow, 2006). This research conducted a study of 100 students to find out the effect of the student's situation at home on mathematical achievement. It depends on the number of people in the house to instill the values and views of parents. The social status of the parents had a significant impact on the child's

mathematical progress. Parents are more likely to encourage their children's academic success. Students who receive support and motivation from their families outperform their peers from unsupportive families in school. This means that if a parent has a high level of education, they can guide the child in a timely manner and tell them about the importance of learning, which in turn leads to mathematical success (Oginni, 2018). The majority of experts agree that low SES has a negative impact on academic achievement because basic needs are not met, and as a result, they do not perform better academically (Adams, 1996). Parental education and the level of family socioeconomic status are positively correlated with the quality of student achievement (Farooq et al., 2011). Low parental SES has a negative correlation with student performance. The relationship between the student's parental relationship and mathematical achievement was studied from 2,866 students. As a result, the student's parents had a positive effect on their child's mathematics performance if they paid attention to their child's learning and took concrete steps to improve their child's progress. It was observed that the close relationship between the student's parents and the child increases the student's self-confidence (Huang et al., 2021). The study was conducted in 21 countries to find a link between parent-child communication and academic achievement. A special place is given to the attention of parents to their children's learning. There is also the influence of parents on the student's attention to the lesson. Based on the results of 21 countries, each country has a different cultural and economic status of the family, which contributes to academic achievement through social and cultural communication between parents and students. The student showed that it is important to be able to ask for help from their parents in a timely manner and to create conditions for their parents to study (Hampden-Thompson et al., 2013). The higher the socioeconomic level of the student's family, the higher the educational expectations of the parents. When a parent with a high social and economic level has access to the necessary materials and resources for his or her child to study, they set high standards for his or her child to achieve his or her goals. And a student brought up in a social and economic family often does not lead to academic success, as such opportunities and requirements for academic achievement are low (McLoyd, 1989). According to this study, according to the author, the profession of the parents affects the choice of profession of the student when entering the university. For example, if the parents have a high socioeconomic status, then the child chooses a high-paying job in order to reach that level (Leppel et al., 2001). As for the next study, the knowledge of the student's parents has a direct impact on the child's academic achievement. It is important to monitor your child's learning and provide adequate support.

### **School Climate**

Children spend a lot of time in school settings communicating with teachers, students, and other people. Therefore, it seems reasonable to assume that school environment and student peer support could also influence academic achievement and educational expectations of students. In this section, I will analyze the research studies in the literature that have attempted to investigate the relationships between school environment and students' mathematics achievement. Literature consistently suggests that the school environment has a great influence on students' academic performance and educational expectations. If the quality of the material and technical base of the school is high, then it shows a positive relationship between the motivation and results of students in the school. The high level of learning atmosphere in the school shows that the school is related to the quality of its construction. Higher levels of student achievement are associated with higher quality climates and in a low quality/working climate school setting, high student achievement scores appear impractical (Shindler et al., 2016). Based on this research, there is a low level of correlation between the general state of construction of the school and the academic achievement of students (Shouppe & Pate, 2010). Cooperation and competition at school are important for the student. According to Shouppe and Pate (2010), the role of school cooperation in the development of student achievement is more important than competition. The cooperation showed a high level of results if it was covered for a short period of time. This is the result of all disciplines. In other words, cooperation and competition in education complement each other and achieve a harmonious relationship (Tauer & Harackiewicz, 2004). In this study, the student's academic performance was linked to the reason for being closer to school. In the study, the higher a student's academic performance, the higher their affinity for school. As a result, the climate at school affects the student (Huebner & Gilman, 2006). The impact of student intervention on academic achievement was studied. In the 2003 PISA survey, 29,983 students from 1,124 schools in Mexico participated. The search goal is to show the effect of student proximity to school. As a result, PISA scores were higher in each area if the student was closer to school. It is not only the influence of one factor, but also the social status and marital status of the student. Another interesting fact is that if a student is in contact with a teacher, his / her school performance is low. The author intends to study this situation for the future (Weiss & García, 2015). According to this research paper, the use of new

approaches that lead to change in school leaders has a positive impact on the development of the school. The teacher's closeness to the school and deep connection with other teachers, it provides to focus on work. The success of a school is due not only to the success of the teachers who work at the school, but also to the leaders who are able to guide the people of the school and make the right strategic decisions. The school leader leads to a positive school climate by guiding and motivating teachers. It is important for school leaders to be open to new things and to create a creative environment for teachers. Therefore, school leaders need to be leaders who push their schools forward and lead to change, which in turn influences teachers, which in turn contributes to students' academic achievement (Allen et al., 2015). The goals set by the school leaders, if consulted with their subordinates, will affect the climate of the environment. Influencing teachers by taking the right steps to achieve the goals set by school leaders, which in turn contributes to the learning of their students (MacNeil et al., 2009). According to the study, the importance of the school climate is well documented. According to the author, one of the most important factors influencing academic achievement is the school factor, and the school climate that affects it. It showed that there is a link between students' negative or positive thoughts about school and their academic performance and also this study identifies anti-bullying attitudes among students as a school climate-related predictor of student achievement (Akhmetov, 2021). The belief that students can succeed in school, the active participation of parents in school activities, the participation of students in extracurricular activities, such steps contribute to a positive school atmosphere (Haynes et al., 1997). According to a study of 380 students, the author studied the social factors of the student at school. As a result, it became clear that the social ability of the student increases the motivation to learn. In other words, in case of difficulties in learning, a student with a developed social ability, in time to ask his classmates and solve the problem. According to research, a student's social skills have a huge impact on academic success (Magelinskaitė-Legkauskienė et al., 2016). By being in school, students are able to communicate with other people and develop themselves intellectually (Webster-Stratton & Reid, 2004). According to this research, 158-year-old students from 158 schools studied the impact of the school climate on academic achievement, and it is necessary to try to avoid the negative conditions in school in mathematics - in education (Demir et al., 2009). In this study of 2,105 students, the teacher-school level showed a link between students' mathematical achievement. The variance of class and school levels is influenced by the initial intellectual level of students and the social status of the family at home, and the interaction of students and proactive teachers, whose mood is focused on learning, has a synergistic effect. The methods used by the teacher in the classroom proved to be important. The author said that there is a positive connection between the opportunity given to the student and his desire to learn. And the teacher's perception of each student as an individual has a great impact (Opdenakker et al., 2002). According to another data, the student's social orientation and academic achievement were correlated. According to him, high-achieving students, in most cases, had a good social status, that is, in case of difficulties in learning, they immediately found an effective way to solve their problems by asking other advanced students for material they did not understand. Students with low communication skills show that they are not able to solve problems effectively in group work (Caprara et al., 2000). Social competence is a combination of the ability to communicate with other students, to benefit another person and to solve problems. Many scholars have studied the relationship between this social competence and academic achievement. The Ministry of Education and Science of the Republic of Kazakhstan focuses on improving the status and professional competence of teachers in the country. In 2016, the Ministry of Education and Science began updating the school's assessment and curriculum to develop students' critical thinking skills. According to the results of our students who participated in PISA in 2009, they showed a very low level of functional literacy. This means that our students will not be able to design and develop the necessary elements based on the information provided.

### **Teacher Factors**

Mathematics achievement is dependent on effective teaching and teacher pressure to succeed. The teacher is the most important factor influencing student learning. If the teacher is ineffective, students under his or her supervision will make unsatisfactory academic progress. It doesn't matter if the students are the same or different in terms of individual potential in academic achievement (Sanders et al., 1997). The teacher's motivation for the lesson influences the students' positive attitude towards the teacher, as a result of which the student feels connected to the school and the mood for learning (Frase & Sorenson, 1992). According to the author of this study, the motivation of students to teach is higher than the enthusiasm of the teacher for the subject. In other words, the teacher talked to the students during the lesson, got to know them well and did his best to make the learning process interesting. Thus, in order for a teacher to feel good in the school environment, it is important to appreciate their

work and help them reach new heights (Peterson & Deal, 1998). By updating the members of the administration who lead the school to develop the atmosphere in the school and create a positive environment, we can not only have a positive impact on students, but also help them improve their academic success (Peterson & Deal, 1998). In this study, the teacher's actions were considered. To see the results of the study, students were tested before and after. The results of the last test were good, and the teacher was able to show his abilities in a positive way, which affected the outcome of the study (Solomon et al., 1964). The study examined this relationship between teacher behavior and student behavior. According to the study, the teacher's actions are considered as a consequence, looking at the behavior and actions of the student in the classroom. Teachers have different views on the difficulty of the student's learning. For example, the study looked at the causes of a teacher's aggressive and compassionate behavior. As a result, the teacher treated students with low achievement and little effort. The implication is that teachers' performance is different, with students behaving differently and pushing forward in order to improve their academic performance (Georgiou et al., 2002). The study looked for a link between teacher behavior and student achievement. As a result, when the teacher's actions are active and comprehensive, they affect the student's learning outcomes (Kyriakides et al., 2009). 153 teachers were asked about the background and methods used in the classroom. The teacher's gender does not affect my academic performance, and if the teacher's working hours are excessive, it affects the quality of work, resulting in poor attention to students and the quality of education. The study also concluded that the frequency with which teachers issued assignments provided that the students completed the assignments, as well as the timely assessment of the assignments, had a significant influence on academic progress. As a result, teacher characteristics and classroom teaching methods have an impact on students' academic performance (Kimani et al., 2013). The results of the work on the teacher factor from 2,404 students were, as follows. The use of traditional methods by mathematics teachers in the classroom proved to be effective, and another observation was that the teacher's gender did not affect student achievement. A teacher's educational qualifications are not a guarantee of excellent student achievement. There is no significant relationship between teachers' academic qualifications and student achievement (Haider & Hussain, 2014). In Singapore, the main focus is on professional development for teachers. In this regard, teachers are able to solve their problems not only in a certain direction, but also creatively, that is, students gain knowledge through play. In addition, journal writing is a great opportunity to participate in extracurricular research. This strengthens the connection between the student and the teacher (Tahar et al., 2010).

### **Student's Attitude**

It can be seen that the students' analytical approach to the problem is not related to their gender. When a student uses his energy and intelligence in both ways to solve a problem analytically, the achievement of mathematics plays a significant role. When a student comes to solve a problem with great enthusiasm, it contributes not only to the current situation, but also to the future (Mohd et al., 2011). According to the author of a study of 1,719 students from middle to high school, students with average grades in mathematics had a positive attitude toward mathematics. Internal factors, such as motivation, confidence, interest, depending on the competence, affect the adolescent's attitude to learning. Thus, based on this research, motivated students will have higher achievement and attitudes in mathematics. In many cases, a student's self-confidence leads to good results, that is, as the student's success increases, his attitude to the subject becomes more positive.

In addition to the teaching experience, teachers influence students' motivation by conveying general learning ideas and creating an environment in which each student can help the group during the lesson. If the student is motivated to learn, it indicates not only a low level of motivation, but also a decrease in confidence and ability to solve the problem. Students with high mathematical achievement showed a positive attitude to the subject, and students who are not close to mathematics showed a low attitude to the subject. In this study, the importance of the teacher in learning is discussed. In mathematics class, the teacher gives the students the right tasks and the words they say during the whole reading affect the student's motivation. Therefore, it is important for teachers to support students in their learning and use the right strategies (Mata et al., 2012).

According to this scientific experiment, 541 students participated. The author notes that students' interest in mathematics has changed as they move from primary to middle school. 8th graders have less interest in the subject than 7<sup>th</sup> graders. This is influenced by the internal situation of the classroom, the size of the classroom and the relationship between teacher and student. However, this study was conducted on a very small scale, so it is not necessary to substantiate this information (Deieso & Fraser, 2019). The methods used by the teacher in the classroom

play an important role in the formation of attitudes to mathematics, and the teacher, focusing not only on the academic knowledge of students, but also on their personal development and abilities, helps the student to overcome difficulties together (Akinsola & Olowojaiye, 2008). According to this study, 337 students aged 10 to 15 years, if they believed that mathematics was not needed in the future, they would not be able to successfully apply the mathematical knowledge they learned in school when it comes to problems that require analytical skills in everyday life. The teacher can increase the confidence of mathematical ability by the fact that each student is at a different level and a good result can be achieved by asking the teacher what the student does not understand. The higher the student's self-esteem, the higher the link between their efforts and achievement. Based on this research, many students are more concerned about their grades in mathematics, but this does not affect their attitude (Marchis, 2011). Negative attitudes towards mathematics affect a student's self-confidence. If the attitude to mathematics is positive or negative, it can be said that it does not change relative to others (Hannula, 2002). This study examined the relationship between student self-confidence and mathematical achievement. The study was based on the results of TIMSS of students from the USA and Japan. In both countries, the higher the confidence of students in the subject, the greater the mathematical success. This means that students are more likely to succeed if they persevere in their homework. Mathematical achievement of students decreased due to interest in the subject. Japanese students have achieved this through repetition in order to succeed in school. This means that the culture of the state has an impact on learning (House, 2006). The gender of the teacher does not significantly affect the attitude to the subject. Students who are able to control their emotions in a timely manner and use all their efforts in the right direction, have a high level of self-confidence, which is adapted to school life and can communicate well with other classmates.

In addition, students who are able to control themselves during school are more likely to succeed in the future in the areas of life they need (Gollwitzer et al., 2011). If a student has a high level of emotional intelligence, it not only contributes to social life, but also leads to academic success. Therefore, the school should contribute not only to the academic development of students, but also to their social and creative growth. According to this scientific work, according to the author, emotionally well-developed students do not move only in one direction, but set the right goals and make every effort to achieve them (Costa & Faria, 2015). This study looked at the link between cognitive, behavioral, and affective activities and mathematical achievement in Malaysia's 1,000 students. According to the author, the strongest influence on mathematical achievement was affective activity. This means that students' interest in the lesson has a great impact on their motivation. However, students who failed to set the right goals showed low academic performance. Therefore, by increasing the interest in the subject, it is possible to change the attitude of students to the subject and achieve mathematical success (Maamin et al., 2021a). Analyzing the research of this author, it turns out that the activity of the student's behavior, motivation and interest in learning leads to academic success. Enthusiastic students try to understand the question posed by the teacher during the lesson and find a solution to it. This happened to students who said they needed to study accordingly. Therefore, teachers should use a variety of methods and techniques in the classroom (Maamin et al., 2021a).

A study of 295,416 students on the mathematical achievement of factors such as interest in learning and the student factor was conducted. The study was conducted in 34 countries. As a result, a student's affective, behavioral, and cognitive abilities can be considered important factors influencing mathematical achievement. There is a strong link between a student's cognitive ability and mathematical achievement. According to this study, it does not mean that we pay much attention to the cognitive state of the student during the study, but it is very important to bring all the components together. Therefore, the school administration and schoolteachers have a great responsibility. This is because the first priority is for the school administration to be able to guide the school staff and for the teachers to unlock the potential of the students (Fung et al., 2018). The survey was conducted on 3,268 students who passed the PISA. The author sought a link between student activity and academic achievement. It turns out that the efforts of students to overcome learning difficulties contribute to academic achievement. Another finding is that if a student feels close to school, they will be able to increase his or her academic performance by accepting the value of learning. Here the proximity to school shows its importance for the student. Add to that the teacher's impact on the student. A teacher can not only motivate academically, but also contribute to social openness. The teacher can create a special creative atmosphere for students at the university, by adding a variety of activities and projects to the lesson. It is true that the behavioral and emotional development of a student increases the motivation to learn (Lee, 2014).

**Table 1.** Study respondents

Gender	N	Percentage (%)
Female	35	61
Male	23	39
Total	58	100

**Table 2.** Categories of participating schools

By category	Percentage (%)	
By type	General education school (36)	62
	Lyceum (22)	38
By gender	Girl	61
	Boy	39

**Table 3.** Shapiro-Wilk for student's attitude, parental support, peer influence, and teacher support

	Teacher support	Peer influence	Parental support	Self-esteem
Shapiro-Wilk W	0.868	0.907	0.905	0.963
Shapiro-Wilk p	< .001	< .001	< .001	0.074

## METHODS

Our study used correlation analysis. First, two districts in Kazakhstan were chosen, Almaty district and Shymkent city are included in this study. 58 students from general education school (62%) and lyceum (38%). The profile of the study respondents is shown in **Table 1**. The number of female respondents was 35 (61%), while the number of male respondents was 23 (39%). Categories of participating schools are shown in **Table 2**.

### Instruments

The instruments used for this study were scores in the 3<sup>rd</sup> quarter and a student questionnaire. The student questionnaire was an instrument designed to collect demographic information, students' perceptions of classroom teaching of mathematics and of teacher, peer and parental support, and attitudinal factors. Most items had to be judged on a five-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree").

### Data Collection

For the data collection, schools were contacted by social network apps. The students were assured of confidentiality and that the data collected in the study would be used for research purposes.

### Data Analysis

Shapiro-Wilk test was used to ensure that all measurements were normal. We used one-way ANOVA for normally distributed samples and non-parametric ANOVA, i.e., Kruskal-Wallis test for non-normally distributed samples. The independent t test was used for gender groups.

Correlation analysis was used to determine the relationship between students' student's attitude, parental support, peer influence, and teacher support, as well as their algebra and geometry grades.

## RESULTS

First of all, we carried out a check for each category for normal distribution. Shapiro-Wilk demonstrated that the scores were normally distributed for students' attitude ( $W[58] = 0.960$ ,  $p = 0.074$ ) and not-normally distributed for Teacher\_Support, Peer\_Influence, and Parental\_Support (**Table 3**).

We used a one-way ANOVA because the student's attitude scores were normally distributed.

**Table 4.** One-Way ANOVA (Welch's) for algebra grade

	F	df1	df2	p
Student's attitude	8.14	2.0	32.6	0.001

**Table 5.** One-Way ANOVA (Welch's) for geometry grade

	F	df1	df2	p
Student's attitude	6.39	2.0	34.7	0.004

**Table 6.** Kruskal-Wallis algebra grades

	$\chi^2$	df	p
Teacher_Support	11.150	2.0	0.004
Peer_Influence	1.630	2.0	0.443
Parental_Support	2.820	2.0	0.244

**Table 7.** Kruskal-Wallis geometry grades

	$\chi^2$	df	p
Teacher_Support	9.410	2.0	0.009
Peer_Influence	0.945	2.0	0.624
Parental_Support	3.178	2.0	0.204

**Table 8.** Correlation matrix results

		Algebra grade	Self-esteem	Parental support	Peer influence
Student's attitude	Pearson's r	<b>0.424***</b>	-		
	p-value	<.001	-		
Parental support	Pearson's r	0.175	<b>0.294*</b>	-	
	p-value	0.190	0.025	-	
Peer influence	Pearson's r	0.110	<b>0.313*</b>	0.208	-
	p-value	0.412	0.017	0.116	-
Teacher support	Pearson's r	<b>0.397**</b>	<b>0.416**</b>	0.165	0.217
	p-value	0.002	0.001	0.216	0.102

Note. \*<.050; \*\*<.010; & \*\*\*<.001

One-way ANOVA results show (**Table 4**) that there was a statistically significant difference in student's attitude scores between algebra grades ( $F[2, 32.6] = 8.14, p = 0.001$ ) and between geometry grades ( $F[2, 34.7] = 6.39, p = 0.004$ ) (**Table 5**). In other words, the student's attitude has an effect on his grades in algebra and geometry.

Kruskal-Wallis test showed algebra/geometry scores; the only significant group difference in algebra and geometry grades, as shown in **Table 6** and **Table 7**, is for teacher support ( $p_{algebra} = 0.009, p_{geometry} = 0.004$ ).

Correlation matrix for the relationships between student's attitude, parental support, peer influence, teacher support and algebra grade are shown in **Table 8**.

There are significant correlation and positive correlation ( $r = 0.424, p < .001$ ) between students' algebra grades and student's attitude and positive correlation ( $r = 0.397, p < .001$ ) between algebra grades and teacher support (**Table 8**).

There are significant correlation and positive correlation ( $r = 0.375, p = 0.004$ ) between students' geometry grades and student's attitude and positive correlation ( $r = 0.429, p < .001$ ) between students' geometry grades and teacher support (**Table 9**).

According to **Table 10**, independent samples t-test for students' attitude ( $p = 0.217$ ), there is no significant effect of gender and Mann-Whitney U used for teacher support ( $p = 0.634$ ), peer influence ( $p = 0.409$ ), and parental support ( $p = 0.320$ ) scores of gender (**Table 11**). The results show that there is no significant effect on teacher support, peer influence, parental support of gender groups.

**Table 9.** Correlation matrix for the relationships between student's attitude, parental support, peer influence, teacher support and geometry grade

		Geometry grade	Self-esteem	Parental support	Peer influence
Self-esteem	Pearson's r	<b>0.375**</b>	-		
	p-value	0.004	-		
Parental support	Pearson's r	0.115	<b>0.294*</b>	-	
	p-value	0.389	0.025	-	
Peer influence	Pearson's r	0.090	<b>0.313*</b>	0.208	-
	p-value	0.500	0.017	0.116	-
Teacher support	Pearson's r	<b>0.429***</b>	<b>0.416**</b>	0.165	0.217
	p-value	< .001	0.001	0.216	0.102

Note. \* < .05, \*\* < .01, \*\*\* < .001

**Table 10.** Independent samples t-test for gender

		Statistics	df	p
Student's attitude	Student's t	1.250	56.0	0.217

**Table 11.** Results of Mann-Whitney U Test for gender groups

		Statistics	p
Teacher_Support	Mann-Whitney U	373	0.634
Peer_Influence	Mann-Whitney U	351	0.409
Parental_Support	Mann-Whitney U	341	0.320

**Table 12.** Independent samples t-test for school type

		Statistics	df	p
Algebra grade	Student's t	1.083	56.0	0.284
Geometry grade	Student's t	0.884	56.0	0.381

In this research we surveyed students who study in two types of schools. general education school (36) and lyceum (22). The independent t-test results show there is no significant relationship between algebra grades, geometry grades and school types (**Table 12**). According to the school type for algebra scores there are moderate differences between general education school and lyceum ( $M_{GS} = 4.22$ ,  $M_{LYC} = 4.00$ ), and there are moderate differences between general education school and lyceum for geometry scores ( $M_{GS} = 4.14$ ,  $M_{LYC} = 3.95$ ).

## DISCUSSION

The research showed that there is a significant and positive correlation between students' mathematical achievement and student's attitude (Deveci & Karademir, 2019). This study explains how students' attitudes toward mathematics learning play a significant role in their mathematical achievement. Increasing this parameter can help students perform better in mathematics (Fung et al., 2018). Students' motivation is greatly influenced by their interest in the lesson. Students who did not set appropriate goals, on the other hand, performed poorly academically. As a result, by increasing interest in the subject, it is possible to change students' attitudes toward the subject and achieve mathematical success (Maamin et al., 2021b).

We found that the teacher has a significant effect on the student's mathematical achievement. The meaning of this word shows the influence of the teacher on the motivational mood of the students, in addition to creating a comfortable learning process and increasing their mathematical achievement even more (Tambunan, 2018).

The current study's findings indicate there was no significant difference in attitudes between genders toward mathematics (Anokye-Poku & Ampadu, 2020). Overall, it was concluded that gender may not be a good predictor of attitudes toward mathematics.

According to research works, there is no significant main effect on achievement scores of school types (Recher et al., 2017). According to the school type for algebra and geometry scores there are moderate differences between general education school and lyceum.

This study was conducted with secondary school students in Almaty region and Shymkent city. The process of translation and expert validation was performed to ensure the suitability of the study in the Kazakhstan context. Assumptions of correlation analysis were also performed. The results of the study show that there was a significant relationship between the teacher, student's attitude to the mathematical achievement of secondary school students. Specifically, positive relationships between teacher factors and student self-confidence attitude with mathematical achievement, moderate relationships between class learning environment and class assessment with mathematical achievement were found

## CONCLUSION

These results are very important for the field of mathematics education at the high school level. This study explains that teacher factors and student attitude confidence in mathematics learning are key factors in students' mathematical achievement. Teacher factors are represented by teaching and learning strategies. Teacher factors that influence mathematics achievement are pedagogical content knowledge, competency, teaching strategies and attitude

### Recommendation

My recommendation for future research is to conduct the study on a larger scale, that is, to increase the number of students participating in the study and to include factors such as the student's home climate and the emotional and social climate of the school setting. In addition, it is necessary to consider the impact of the teaching plan in the educational system on the student's academic progress.

### Limitation of the Study

One limitation of the current study is the number of students studying in general public schools (n = 36) and lyceums (n = 22) is not equal. The number of students at one institution may indicate its relative superiority.

A second limitation of the study is general public students are selected from those who study in higher classes (10/11<sup>th</sup> grades), and lyceum students are only one class (8<sup>th</sup> grade). The age difference between students has an impact not only on the level of influence, but also on the comprehensive approach to research.

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