Impact of a Positive Classroom Climate on Sixth Graders' Motivation to Learn Mathematics at Northern Israel's Arab Minority Schools

Nabil Assadi ᴵᴰ
Sakhnin Academic College for Teacher Education, ISRAEL

Abstract. This study aimed to investigate the impact of a positive classroom climate on sixth graders' motivation to learn mathematics in Northern Israel's Arab minority schools. The study sample consisted of 50 students of the Sixth Grade in the primary stage in two Arab minority towns in Israel's northern region. The central research hypothesis touched on how much the classroom climate affects students' motivation to learn mathematics from the point of view of sixth graders in Northern Israel. The research incorporated the descriptive analytical approach that describes the phenomenon as in reality, and expresses it quantitatively and qualitatively. Based on the results of the research, the research hypothesis was realized, which indicates that a healthy, supportive, and compassionate classroom climate positively affects students' motivation to learn mathematics. The research points to the importance of an effective classroom climate in the educational process and in students' motivation to learn. The paper contributes to the academic community by asserting that a positive atmosphere in the classroom seems to lead to better interaction between students and a more comprehensive possibility of expression, and has the potential to reduce the level of violence between them.

Keywords: educational process; mathematics teaching and learning; motivation to learn mathematics; positive classroom climate; Sixth Grade students

1. Introduction

The significance of this study lies in its examination of the topic of classroom climate and its importance in providing appropriate elements that reinforce students' stance and development during the educational process. Teaching and learning are higher mental and cognitive processes, but they also include emotional, affective, and sentimental aspects that are greatly influenced by the atmosphere in the classroom. The classroom climate could be an environment that is characterized by safety, comfort, and unlimited support, which in turn leads to improvement in the academic achievement of students. Yet, it could be a highly

tense environment that negatively affects the educational process and the students' behavioral and psychological aspects. It is the classroom climate that influences the learning process of each student, and indirectly the way they adapt socially and academically.

Positive climate components and methodology are numerous yet interdependent. The basic components of a positive classroom environment intersect continuously and comprehensively throughout the educational process. Certain major components constitute a positive climate. These include a proper physical atmosphere; availability of and access to tools and pedagogies; a comfortable and caring space where students spend the duration of their scholastic day; and a safe, supportive, and inclusive environment where the sense of hostility and aggression is absent.

The classroom climate shapes the students' learning environment and deeply influences the psychological and social processes that occur between the teacher and the students, on one hand, and between the students themselves, on the other hand. That is, it is a perceptual and subjective concept, which is defined not as an objective picture of reality but as a set of perceptions of all people involved in the educational process. This self-awareness is a critical factor in the design of the teaching process and for the student's skills (Freire, 2020).

The classroom climate is defined as an intellectual, social, emotional, and physical environment in which students learn. It is determined by a range of interactions between different factors, such as teacher-student relationships, student-student relationships, student composition, stereotypes, diversity of views, and more. This definition is supported by previous definitions that also address structural aspects of classroom organization, teaching methods, discipline, gender, and age. The factors of the nationality, society, and religion to which teachers and students belong are also included.

According to Mega et al. (2014), all human behavior in general and the behavior of students in particular involve an emotional and cognitive element, both of which affect the behavior of students during the learning process, and their thinking and development. Perception guides the students in their actions, while emotion is the basis of energy and the driving force of cognitive activity. These two components – emotion and perception – work in parallel and maintain a relationship of mutual influence.

In a study conducted by Zuković and Stojadinović (2021), they indicated that a constructive classroom climate contributes to the student's positive self-esteem. It provides confidence, cultivates personal responsibility, refines the student's character, increases the desire to participate, and influences academic achievement. In this respect, an effective classroom climate enhances the importance of the educational process and the significance of learning, as it aims to place attention on the different aspects of the student's character by working on the introduction of educational strategies that enhance the student's attitudes at large.

The research problem of the study stems from the following main question: How much does the classroom climate affect students' motivation to learn in the subject of mathematics from the point of view of sixth graders in Northern Israel? In connection with the previous works, the urgency of the study problem is evident within the connection of this work to other works in the field. In the same respect, the paramount role of the teacher in the educational process emerges and in the development of an effective classroom climate. The role of the educator is to work on providing mechanisms and tools that foster an effective classroom climate, in addition to the use of teaching tools that contribute to the development of the students' skills and acquired knowledge (Adu & Olatundun, 2007).

2. Literature Review
2.1 The Concept of "Classroom Climate"
There are numerous terms in the literature that attempt to describe the psychosocial conditions within the classroom climate. Dörnyei and Muir (2019) described it as "the classroom climate", "the classroom atmosphere", and "the social climate in the classroom". Another common approach also tackles the relationship between the teachers themselves and their impact on the learning-teaching process. The multiplicity of methods sometimes makes it challenging to compare the results that appear in different studies; however, there is consensus that a positive classroom climate has a positive impact on both the social and academic growth and development of the students (Rapti, 2013). The social environment, which is evaluated in numerous ways, has a great predictive capacity in relation to academic achievement, and together, all types of climates separately create a unique study climate that affects students on personal, social, and academic levels (Cortés Pascual et al., 2019).

2.2 Motivation to Learn
Most current theories about motivation are based on the concept of motivationalism. These theories deal with factors that promote or impede understanding the mechanistic environment as a result of behavior to achieve these results. According to Bronson and Bronson (2001), the self-directed theory carries another important distinction between the type of intentional or preventive behaviors and distinguishes between two types of deliberate regulation. Self-direction, control, and motivational activities are so self-directed that engaging in them is entirely voluntary and is seen as arising out of and reflecting the individual self; conversely, actions are controlled when they are forced by certain personal drives. A self-directed regulation stems from the individual's own will, capacity, and motivation to achieve and/or accomplish a particular objective. The motivational counterpart, on the other hand, is normally the fallout of a particular external force that influences the individual.

When the behavior is self-directed, the process of regulation is a choice; but when controlled, the process of regulation is obedience. The dimension is also described in guided responses that extend from self-directed to controlled using the concept of "perceived causal focus". When behavior is self-directed, a person realizes that the concentration of causality is within the self; whereas when the behavior is controlled, the perceived concentration of causality is outside the self. The important point of this distinction is that both self-directed and controlled

behaviors are motivational or deliberate, but their organizational processes are quite different (Raidal & Volet, 2009).

Nicol and Macfarlane-Dick (2006) argued that the term "stimulus" refers to the desire to invest time and effort in a particular activity, even when it involves difficulties, high prices, and failures. By this definition, motivation is an internal psychological entity, and its strength can still be assessed in different ways. For example, through verbal conversations and reports, or by following behavioral expressions, such as investing effort and time in the relevant activity, presence and accuracy, perseverance and effort despite difficulty or failure, responding to challenges and fulfilling commitments.

Takahashi (2018) distinguished between two types of motivation. **Internal motivation for learning** occurs due to the determination of the intrinsic value of the activity. An activity is an essential means of enabling another that provides benefit or pleasure, or the activity has an ethical value whose justification is clear, where the feelings observed are lack of conflict, relative peace, and satisfaction. **External motivation** occurs due to fear of punishment or out of hope for materialistic reward, or to obtain privileges.

2.3 Factors Influencing the Classroom Climate
Abdullah (2019) pointed out that there are many factors that work on the impact of the establishment of an educational climate. The most important of these factors is the school culture that influences the establishment of the educational climate. There are numerous educational institutions that fail to address the personality traits of the teacher and students alike and do not pay attention to the development of the abilities and skills that they enjoy, which reflects negatively on the educational process.

Reyes et al. (2012) also pointed out that there are numerous factors that negatively affect the development of the classroom climate in the educational process. The most important of these is the teacher's inability to maintain a healthy relationship with the students, as a healthy relationship and effective classroom interaction between teachers and students are among the most important factors that develop the ability to create an effective classroom climate and a constructive educational environment.

Wang and Degol (2016) summarized the factors that negatively influence the creation of an effective classroom climate. Physical environmental factors are the most important, which relates to the lack of educational and technological tools and means. Other factors are lack of information about the importance of interaction in the educational process and strict laws that prevent teachers and students from participating effectively in the ongoing educational process. Furthermore, the large number of students per classroom is also a factor, leading to over-crowdedness in the classroom, and therefore students do not feel comfortable within the classroom environment. Lastly, there is the teacher's inability to deal with students according to their abilities, challenges, and personal

variations, and therefore the students do not sense a positive educational atmosphere.

2.4 Types of Classroom Climate

Godfrey and Grayman (2014) tackled the notion of "critical consciousness and civic development among youth", based on which they propped the active participation of teachers in the decision-making process as a team, thus giving a sense of belonging. The principal's consideration of teachers' opinions and students' participation in decision-making is a distinctive feature of an open classroom climate. According to Godfrey and Grayman (2014), the open climate induces joint thinking, and therefore teachers and students feel involved in the decision-making process, which will lead to the promotion of a positive climate in the school.

Sandahl (2016) distinguished between two types of classroom climate – learning climate and social climate. Both types of climate relate to the behavior, attitudes, and perceptions of faculty and students regarding the educational process at large, and the relationships between the people who are engaged in it. The learning climate and the social atmosphere surround most of the student's experiences and generate the factors that directly affect them.

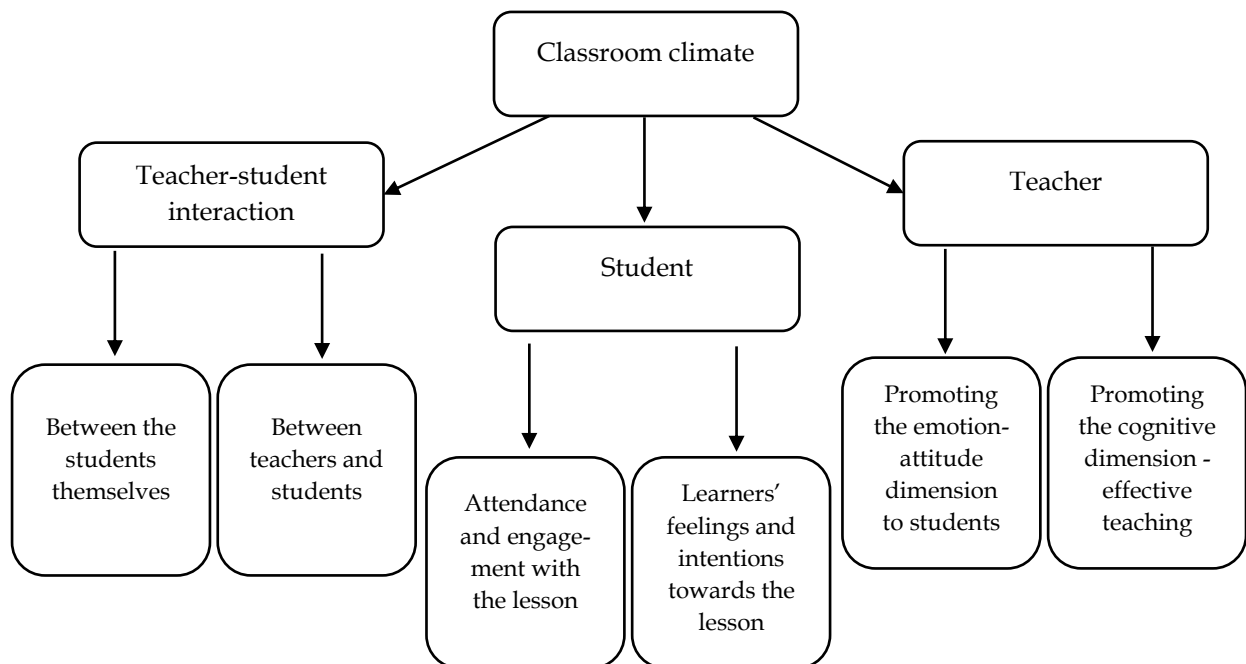## 2.5 Role of the Classroom Climate in Influencing Students' Motivation to Learn

According to López et al. (2018), the classroom climate is one of the most vital elements that impacts the development of the educational process. The classroom climate affects the psychological aspects of the student. This is because it enhances the possibility of developing a sense within the student's personality that they are the focus of the learning process, and that they are the most important element in the educational process at large. The classroom climate affects numerous other aspects in a student's personality, the most important of which are the educational, mental, and social aspects. A positive classroom climate aims to develop constructive interactions between teachers and students; thus, students begin to develop a positive feeling towards their teachers. This also helps in developing the student's ability to take responsibility for the educational process on their own, as it supports the possibility of active and effective participation in the educational process at large (Darling-Hammond & Cook-Harvey, 2018).

La Salle et al. (2016) found that there is a positive link between classroom climate and motivation to learn, as the classroom climate has a significant impact on the involved students on personal, social, and academic levels. Berkowitz (2022) concluded that a positive classroom climate contributes to positive results. At the personal level, it leads to self-esteem and the development of the student's self-identity, a sense of personal security, a sense of belonging, active involvement, and, ultimately, success. At the social level, it has been shown that students function better within a cooperative environment. This contributes to the development of a democratic personality and leads to open-mindedness. At the educational level, the cooperative environment has also been found to contribute to increased motivation to learn, higher academic achievement, and even developing the willpower to stand out among other students. A positive classroom climate is a vital factor that serves as a means for effective learning. It

is thus important to nurture it and invest a lot of time in its creation and incorporation (Zedan, 2010).

Akkanat and Gökdere (2018) investigated the importance of the social climate within the classroom, showing that it influences the learning process, where the social climate is one of the most influential factors in the student's success. Sometimes a student is afraid of rejection from their peers and might therefore be convinced that academic success will ensure them a higher rank in the school's hierarchy. When there is a healthy educational atmosphere in the classroom, students could very easily sense it and even participate in this atmosphere and thus progress towards success. This atmosphere is of utmost priority to most students, because they possess an innate desire to sense belonging and significance in the group. The class sets a standard and rules that affect the student's success, and the agent leading the class in this particular approach is the class teacher.

In their study, Gustafsson and Nilsen (2016) also identified identical general model components in the classroom climate, which can be presented according to three factors: student, teacher, and interactions between them. Two categories were identified for both student and teacher in the study. The interaction factor includes one category, which deals with communication between students themselves and between them and the teacher. Therefore, students perceive the concept of "classroom climate" as a concept related to the orientation of learning and feelings towards it, the involvement and participation of students, effective teaching, the teacher-student relationship, teacher-student interaction, and student-student interaction. The study also identified the components of the general model of classroom atmosphere, as shown in Figure 1.

Figure 1: Components of the General Model of the Classroom Atmosphere (Gustafsson & Nilsen, 2016)

The importance of the classroom climate can thus be summarized in influencing the learning process, especially in the teaching of mathematics. Here, teachers have a major responsibility to carry out the learning activity by finding the correct teaching methods, and working on the development and progression of the educational process for students, where the student is the focus of the process at large.

2.6. The Teacher's Role in the Creation of the Classroom Climate

According to a study by Wilson-Fleming and Wilson-Younger (2012), the teacher is considered the basis of the educational process (the student being the focus of the same process), as the teacher has an indispensable role in working on the development of the student's abilities in terms of addressing the promotion of their special aspects. Teachers have an affective role in contributing to the development of the student's educational abilities. They indeed possess the capacity to formulate a positive classroom climate through (Wilson-Fleming & Wilson-Younger, 2012), firstly, working on the selection of educational strategies that enhance student attitudes during the educational process, in addition to paying attention to the psychological aspect of students and to the development of positive behavior throughout learning. Secondly, they pay attention to the interactive aspect of students by increasing the interaction between teachers and students during the learning process. Third, teachers develop the existing teaching themes and trends through reliance on collaborative or research teaching methods. Furthermore, they actively and effectively engage students in decision-making, critical-thinking, and solution-finding activities. Lastly, teachers place more attention on modern educational games and software, as these could help to get students out of the circle of boredom and monotony.

Dulay and Karadağ (2017) also conducted a study where the effect of climate on student achievement was examined in the study's meta-analysis. A total of 237 previous studies were collected for the literature review, out of which 90 were included in the meta-analysis. The 90 research studies were compiled to obtain a sample size of 148,504 subjects. The results of the random effect model showed that climate had a medium-level positive effect on student achievement.

3. Definitions Pertinent to the Work

3.1 Motivation

Based on the general context of Dulay and Karadağ (2017), motivation could be defined as a person's desire to invest time and energy in a particular activity, even if that activity is complex and difficult. Here, the student's ability and self-efficacy are expected to assist them to deal with negative emotions, emotional distresses, and complexities such as the pressure exerted by a peer group or school subject's difficulty.

According to Akkanat and Gökdere (2018), a set of internal and external circumstances directs an individual towards rebalance, when they are disturbed, in order to achieve their needs and/or goals. In the same context, and based on insight into the study of Copur-Gencturk (2015), motivation could be defined as a physiological state – where if a goal is not achieved, an internal psyche moves the individual to carry out a certain behavior to achieve it.

In this study, motivation to learn can be defined as a trait that stimulates an individual to do or not do a particular task or activity in association with the attitudes, perspectives, beliefs, and values of that individual. It is defined procedurally as the score students obtain on the measure of motivation towards learning mathematics.

3.2 Classroom Climate
The classroom climate is defined as an intellectual, social, emotional, and physical environment in which students learn. It is determined by a range of interactions between different factors, such as teacher-student relationships, student-student relationships, student composition, stereotypes, diversity of views, and more.

4. Methodology
In light of the nature of the study, and the data to be obtained, the descriptive analytical approach was incorporated. This approach describes the study phenomenon as in reality, and expresses it quantitatively and qualitatively, to reach an understanding of the phenomenon, in addition to reaching conclusions and generalizations that help in the development of the studied reality. This study relied on the questionnaire as the main instrument for collecting data relevant to the study problem.

Twelve weeks after the intervention was performed, the five factors listed in the questionnaire at the end of the procedure were compared with the case initially measured. The results of the study showed that in two factors, there was a significant difference, and the factors of friction and competitiveness decreased between the experimental groups. In other words, and as emphasized by Evertson and Weinstein (2006), the intervention procedure contributed to reducing competitiveness and friction in the experimental group and thus improving the overall stratigraphic climate. These findings were supported by reports of students who participated in the initiative and teachers who accompanied the class before and after the process.

4.1 Study Population
The study population consisted of all the Sixth Grade pupils in the primary stage in the towns of Bir al-Maksour and Kafr Kana in Northern Israel. In all, there were 182 Sixth Grade pupils in the towns at the time of study.

4.2 Study Sample
The actual study sample consisted of 50 Sixth Grade students in the primary stage in the towns of Bir Al-Maksour and Kafr Kana, with the sample being 27.5% of the study population. This percentage helped in obtaining a high degree of accuracy. Students were selected from six classes in primary schools in both towns. The demographic variables of respondents were analyzed and are displayed in Table 1.

Table 1: Distribution of respondents' demographic variables

	Variable level	n	Percentage (%)
Parents' relationship status	Married	40	80%
	Divorced	10	20%
Economic status	Low	8	16%
	Medium	30	60%
	High	12	24%
Father's education	High school diploma	25	50%
	Vocational education	11	22%
	Academic education	14	28%
Mother's education	High school diploma	18	36%
	Vocational education	18	36%
	Academic education	14	28%
Mother employed	Yes	34	68%
	No	16	32%

4.3 Research Instrument

In this study, the questionnaire instrument was used to identify the extent to which the classroom climate affects student motivation to learn mathematics from the point of view of Sixth Grade students. The questionnaire in its final form consisted of two parts. The first was on the classroom climate, which consisted of nine domains (as appears in Table 2), while the second was motivation to learn mathematics, which consisted of five domains (as appears in Table 3). The questionnaire was constructed in proportion to this study and in line with its theoretical framework, and through consulting specialists in the field. The prior considerations enabled me to determine the parts of the questionnaire and its domains that were set in their final form.

4.4 Credibility of the Research Instrument

The validity of the questionnaire was confirmed in two different ways. The first method involved the honesty of the arbitrators (the apparent honesty of the questionnaire). The scale was presented to five arbitrators, who were supervisors of mathematics and mathematics teachers in the northern region of the country. This was done to verify the appropriateness of the scale for what it was prepared for and the integrity of the wording, consistency, coherence, and cohesion of the paragraphs, and that each of these belonged to the field in which they were developed. After reviewing the notes of the arbitrators, the paragraphs that were not agreed upon were deleted, and the paragraphs that were unanimously agreed upon by more than 70% of the arbitrators were added in their final form, as shown in the study.

The second method involved internal consistency. The validity of the questionnaire was verified using the Statistical Package for the Social Science (SPSS) program by calculating the Pearson correlation coefficient between the degree of each paragraph of the questionnaire and the total score of the domain to which it belonged. Table 2 shows the Pearson correlation coefficients between each paragraph of the questionnaire with its counterparts, and the total degree of the questionnaire.

Table 2: Correlation coefficients between each paragraph of the questionnaire and the overall score of the domain to which it belongs

Classroom climate		Motivation to learn mathematics	
Paragraph	Correlation coefficient	Paragraph	Correlation coefficient
1	.705**	1	.751**
2	.728**	2	.797**
3	.809**	3	.619**
4	.727**	4	.756**
5	.751**	5	.845**
6	.748**	---	---
7	.565**	---	---
8	.814**	---	---
9	.828**	---	---

** Statistically significant at significance level $\alpha \leq .01$

Table 2 shows that there were positive and statistically significant correlation coefficients, which indicates the validity of the internal consistency between each paragraph of the questionnaire, and the overall score of the domain to which it belongs.

Table 3 shows the Pearson correlation coefficients of the domains of the questionnaire between each other, and the total degree of resolution of the questionnaire.

Table 3: Correlation coefficients between each of the resolution domains with each other, and the total degree of resolution

Components	Motivation to learn mathematics	Overall score
Classroom climate	.619**	.849**
Motivation to learn mathematics		.797**

** Statistically significant at significance level $\alpha \leq .01$

Table 3 shows that there were positive and statistically significant correlation coefficients between each of the resolution domains and the total resolution score, indicating the validity of the internal consistency between the resolution domains and the total resolution score.

4.5 Stability of the Research Instrument
The stability of the research instrument was verified via the internal consistency coefficient by calculating the coefficient equation. It reached .854 for the total domain (Table 4). The values of the stability coefficients for the two domains of the questionnaire are shown in Table 4.

Table 4: Stability coefficients of the domains and the total degree of the questionnaire according to the Cronbach alpha coefficient equation

Domain	Number of paragraphs	Stability coefficient
Classroom climate	**9**	**0.893**
Motivation to learn in the subject of mathematics	**5**	**0.725**
Degree of total stability	14	0.854

As shown in Table 4, the classroom climate domain obtained a stability coefficient of 0.893, which is higher than the coefficient obtained for the domain of motivation to learn mathematics (0.725). Conversely, the value of the total stability coefficient was 0.845, which is an educationally acceptable stability coefficient for the purposes of the current study.

4.6 Procedures
In the first stage, the topic was selected, and then the theoretical materials prepared and research methodology planned. This included the research instrument, description of the study population, and analysis of the data. In the second stage, the questionnaires were administered to the respondents after the necessary permissions had been granted. The third stage involved analyzing the questionnaire, discussing the results, reaching conclusions and making recommendations.

4.7 Statistical Treatments
To process the data, I used SPSS software with the following statistical treatments: means and standard deviations, Pearson's correlation coefficient, and Spearman's correlation coefficient.

4.8 Research Problem and Question
During the field visits to follow up on the students' performance, it was noted that the learning of mathematics topics among Sixth Grade students in the northern region of the country was not the same as it is in other schools. The teacher of this class pointed out that the motivation of students to learn mathematics topics was low, and this is what prompted me to search for some variables that may be associated with motivation to learn mathematics. I expected that the classroom climate has an impact on that, and thus the problem of the study lies in answering the following question:
- How much does the classroom climate affect students' motivation to learn in the subject of mathematics from the point of view of sixth graders in Northern Israel?

4.9 Study Hypothesis
The current study attempted to validate the following hypothesis:
- There is a positive correlation between a positive classroom climate and students' motivation to learn mathematics.

4.10 Objectives of the Study
The study aimed to:
1. Examine the importance of a positive, healthy, compassionate, and supportive classroom climate.
2. Examine the impact of the classroom climate on students' motivation to learn.
3. Examine the teacher's role in creating a positive, healthy, compassionate, and supportive classroom climate.

4.11 Significance of the Study
The study topic, and in which way it may support achieving the study objectives, was chosen because an effective educational climate is one of the most vital elements that contributes to increasing students' desire to learn and succeed. An effective educational or classroom climate aims to develop students' attitude towards learning and to offer them the possibility to function within an interactive atmosphere, and thus it is reflected in their motivation to learn and succeed.

5. Study Limits
Spatial boundaries: The study was limited to Sixth Grade student in the primary stage in two Arab minority towns in Israel's northern region.

Time limits: This study was conducted between September and December 2021, during the scholastic year.

Objective limits: The study was limited to the subject of classroom climate in connection to students' motivation to learn mathematics.

Human boundaries: The study was limited to Sixth Grade students at the primary level.

External limits: Lockdown, social distancing, and hybrid teaching were all procedures that the Israeli Government put in effect from the very first days of the Covid-19 pandemic. These procedures did in fact alter students' perception of the classroom at large, as for the first time in their scholastic years they received a good portion of their education outside its walls.

6. Results
To answer the research question, means and standard deviations were extracted from the data. Table 5 presents the means and standard deviations of the first questionnaire domain – classroom climate.

Table 5: Means and standard deviations of the domain classroom climate

Domain	N	Mean	Standard deviation
A general positive feeling towards school	50	3.93	0.76
Relationship between students and their classmates	50	3.68	0.63
The school's efforts to encourage social and civic participation	50	3.82	0.68
The school's efforts to promote tolerance towards the other and the different	50	3.61	0.84

A sense of protection at school	50	2.51	0.53
The school's efforts to encourage a sense of protection	50	3.18	0.99
Proximity and care between students and teachers	50	3.04	1.08
Ability, curiosity, and interest in learning	50	2.99	1.2
Quality practice in teaching, learning, and evaluation	50	3.38	0.46

Table 5 shows that the mean scores ranged between 2.51 and 3.93. The highest was for the field of "a general positive feeling towards school", with a high score. The lowest was for "a sense of protection at school", with a relatively low score and close to the answer in an average manner, meaning that the majority of respondents did not have a sense of protection at school. That is, the majority of respondents were not motivated to learn mathematics because of the "relationship with the school". In addition, for the variable "ability and curiosity", the result *moderately agree* (M = 2.99, SD = 1.2) was observed.

Table 6 depicts the means and standard deviations of the domain motivation for learning mathematics.

Table 6: Means and standard deviations of the domain motivation for learning mathematics

Domain	N	Mean	Standard deviation
Internal motivation	50	3.31	0.55
Relationship with the school	50	2.60	0.43
Perception of independence	50	3.59	0.70
Perception of the teacher's attitude	50	3.04	0.59
Importance given to evaluation	50	3.16	0.42

Table 6 shows that most variables were close in average to the answer the respondents chose from scale 1 (*never*) to 5 (*very significantly*), except for one variable, namely "relationship with the school", where the mean was relatively low (M = 2.6, SD = 0.43) and close to the answer (*moderately agree*). That is, the majority of respondents were not motivated to learn mathematics due to reasons that could be linked to the relationship with the school. Table 6 shows that the averages ranged between 2.60 and 3.59. The highest of was for the field of "perception of autonomy", with a high degree, and the lowest was for the field of "relationship with the school", with a relatively low score and close to the answer in an average manner. That is, the majority of students were not motivated to learn mathematics because of the "relationship with the school".

An analysis was carried out to examine the hypothesis according to the Spearman correlation coefficient: There is a positive correlation between a positive classroom climate and students' motivation to learn mathematics. Table 7 presents the correlation coefficients between the variables of the domains.

Table 7: Pearson's correlation coefficient between the domain variables

Classroom climate	Motivation to learn mathematics					
		Internal motivation	Relationship with the school	Perception of independence	Perception of the teacher's attitude	Importance given to evaluation
A positive general feeling towards school		.889***	.698***	.720***	.732***	.716***
Relationships between students, their friends, and the class		.651***	.718***	.890***	.822***	.898***
The school's efforts to encourage social and civic participation		.839***	.878***	.852***	.828***	.857***
The school's efforts to promote tolerance towards the other and the different		.746***	.900***	.858***	.881***	.868***
A sense of protection at school		-.229	-.411	-.517*	-.519*	.464
The school's efforts to encourage a sense of protection		.815***	.798***	.715***	.752***	.733***
Proximity and care between students and teachers		.626***	.856***	.913***	.904***	.903***
Ability, curiosity, and interest in learning		.872***	.736***	.717***	.697***	.706***
Quality practice in teaching, learning, and evaluation		.732***	.928***	.948***	.870***	.943***

*** $p < .00$, ** $p < .01$, * $p < .05$

Table 7 shows that there was a very strong correlation between the variables, except for one variable, "a sense of protection at school." It has been concluded that there is no relationship between this variable and the "internal motivation" and "school attitudes" variables. Indeed, a significant negative relationship was found between "perception of independence" and "sense of protection at the school" (r = -.517, p = .05). This shows that as the sense of school protection increases, the sense of independence notably declines. A moderately negative correlation was found between the sense of protection at school and perception of the teacher's attitude (r = .519, p = .05), which shows that as the sense of protection at the school increases, the perception of the teacher's attitude in the school declines. To paint a more vivid picture, another analysis of the averages of variables was carried out to create two main domains, "classroom climate" and "learning motivation". Table 8 describes the mean and standard deviation scores of these two variables, while Table 9 describes the Spearman correlation coefficient between the two.

Table 8: Mean and standard deviation scores of the two main domains

	N	Mean	Standard deviation
Classroom climate	50	3.35	0.68
Learning motivation	50	3.14	0.51

Table 9: Spearman correlation coefficient between the two main domains

	Motivation to learn
Classroom climate	.922***

*** $p < .00$, ** $p < .01$, * $p < .05$

As seen in Table 9, it appears that there was a strong correlation between the classroom climate and students' motivation to learn mathematics ($r = .922$, $p = .00$), which confirms that the study hypothesis has been realized.

7. Discussion

Sandahl (2016) indicated that the classroom climate is generally related to students' perceptions of their school, their behavior within the classroom, their attitude towards learning, and the activities offered within the school walls. The school should strive to provide an ideal classroom climate that allows students to achieve worthy academic achievements, taking into account their emotional and social needs. In connection to the findings of Reyes et al. (2012), a school with an optimal educational climate is an educational institution that allows its attendees to reach their full educational potential; develops their ability to endure stressful situations; increases creativity; and reiterates the values of tolerance, cooperation, interpersonal communication, and the ability to learn and progress optimally. All these factors should be high on the school's agenda, while meeting the basic needs of the students and staff.

According to the research hypothesis, and in line with the results of the study by Cortés Pascual et al. (2019), the classroom climate has a great impact on the motivation to learn at large. The research hypothesis stipulated that there is a positive relationship between a positive classroom climate and the motivation to learn mathematics. Accordingly, the results of the questionnaire indicated that the classroom climate has a great impact on raising the level of positive relationships between teachers and students, in addition to creating a consensual feeling among the students that the school is a safe place. This finding is also supported by the findings reached by Raidal and Volet (2009) on the same domain.

In line with the findings of Dörnyei and Muir (2019), this study also found that the classroom climate generates a general positive feeling by enhancing the school's efforts to encourage social and civic participation, in addition to the school's efforts to promote tolerance towards the other and the different. An effective classroom climate contributes to the development of students' ability to show curiosity and interest in the educational and decision-making processes in a simultaneous fashion. This conclusion has been confirmed in the findings of other scholars (Godfrey & Grayman, 2014; Zuković & Stojadinović, 2021).

Abdullah (2019) examined the relationships between the factors of classroom climate as perceived by students within the ambit of various backgrounds, such as gender, grade, achievement, and area of residence. The study included Fourth, Fifth, and Sixth Grade students from Arab primary schools that belonged to different geographical regions and backgrounds. A questionnaire was incorporated to examine five factors: satisfaction and pleasure, teacher-student

relationship, stress and gender inequality, student-student relationship, and competitiveness. This instrument, that is the main data collection approach in this study, was also incorporated into numerous previous studies on the same domain (Davis & Warner, 2018; Raidal & Volet, 2009).

Pertaining to gender as an influential variable, Godfrey and Grayman (2014) found that the level of satisfaction, pleasure, and relationship between students themselves was higher among girls than among boys. Within the same study, the level of stress and gender inequality was found to be higher among boys. The results of this study showed that teacher-student relationships were better among students who learned in the front-end way than among students who learned in a collaborative way. However, the level of competitiveness among students who learned in a collaborative way was higher than the level of competitiveness among those learning at the front. This is also in line with the findings of Akkanat and Gökdere (2018), whose focus was on gifted students in particular.

Another intervention study which supports and reiterates the findings of this study is the one conducted by Zedan (2010). The study investigated the classroom climate where students were allowed to actively and effectively participate in the decision-making process while studying mathematics. The students were consulted on the manner and level of their upcoming test, that is the content and difficulty level of the test. The researchers reported that a specific intervention program focusing solely on social rather than academic aspects was activated. This environment influences the students' behavior, and within such context, the classroom climate could be defined as the attitudes and perceptions of students working in the classroom and the intertwined relationship between them. The definition of classroom climate by Zedan (2010) is relevant to the discussion at this stage, as it reiterates the vitality of non-physical factors that constitute the classroom environment at large.

With similar procedures and approaches to the ones adopted in this study, the study of Abdullah (2019) touched on the fact that the school as an institution has a great impact in influencing the educational process, and on the effectiveness of the academic and social functions attributed to it. In this domain, the institution has an impact through working on the students' educational, social, behavioral, and sentimental development.

The current study drew closer attention to the development of the classroom climate as a central educational concept. This is also reiterated by the findings of Copur-Gencturk (2015), who argued that there should be no situation where a student feels sad, threatened, or neglected.

According to Davis and Warner (2018), and in connection to the findings and the final results of the current study, it can be indicated that within the classroom, social processes are created that are influenced by the characteristics of the physical environment, students, teachers, and other organizational characteristics. All these have implications for the unique characteristics of the

classroom, namely norms, attitudes towards learning, performance of tasks, democracy, mutual aid, cooperation, cohesion, and communication patterns.

In connection to the findings of this study, Darling-Hammond and Cook-Harvey (2018) showed that a positive classroom climate was associated with a low level of violence in the classroom. The positive atmosphere in the classroom seems to lead to better interaction between students and a more comprehensive possibility of expression, and has the potential to reduce the level of violence between them. No gender differences were found in classroom perception, but teacher support was found to be more important among girls.

Besides comparing findings and facts in the field, solutions to answer problem statements in research are also vital for the research to actually contribute to the academic community. The current article provides insights and in-depth, first-hand expertise by practically investigating the notion of classroom climate and its role in the provision of feasible and viable elements that reinforce students' stance and development during the educational process. Here, we shift the emphasis from the teacher as a *facilitator*, the students as the *center of the process*, and the curriculum as the *means* to the climate and environment as *comprehensive system* in which all these factors can exist and function effectively.

A profound interpretation of the research results will lead to the conclusion that the physical environment where the educational process occurs is not only a key factor but also a major influence that could make or break the process. It has already been established that a negative classroom climate, one characterized by fierce competitiveness, hostility, and alienation, leads to anxiety among students and may delay their emotional development. This is in contrast to a positive classroom climate, where students' strengths and mutual support are emphasized, leading to the development of personal responsibility, participation, sense of belonging, and self-esteem.

An important aspect that pertains to the results of this study is that numerous variables actually emerged during and throughout the research process. One prominent feature that was observed was that the majority of the respondents were not motivated to learn mathematics due to reasons that could be linked to the relationship with the school. Based on this, it could be inferred that mathematics as a school subject did not constitute a problem to the respondents. Indeed, what they perceived as a problem was the physical environment in which they were actively exposed to the subject.

8. Limitations
This study used the questionnaire instrument, whose credibility and validity were thoroughly confirmed, after which the responses of the study sample to the instrument were addressed and construed.

9. Conclusion
Based on the instrument used to achieve the research objectives, and on the subsequent findings, it may be concluded that the classroom climate is a concept

that represents the organizational and social environments in addition to the physical environment that encapsulate the learning process. As such, it is vital to recognize that the environment has an impact on human behavior, and that environmental change can lead to the improvement of an individual's feelings. Within the school environment, students are directly exposed and subjected to experiences that affect their identity, belief system, personal skills, and psychological aspects. In the same respect, this study concludes that the classroom climate is the optimal influence of the interactions occurring intuitively within the educational process.

The study contributes greatly to the scientific and educational communities by creating a bridge between a material aspect (classroom environment) and a psychological depth (motivation). The study also contributes to a modern educational mindset that draws more attention to the students' comprehensive status and regards them as the center of the learning-teaching processes at large.

An important conclusion in the same respect is the fine yet potent link between the general school climate and students' tendencies and desirability towards a particular subject of the curriculum. It may be concluded that a healthy school environment that is safe and supportive could indeed change students' perception of school subjects that have long been deemed complicated and challenging, such as mathematics.

10. References

Abdullah, M. (2019). School culture to serve performance of madrasah in Indonesia. *QIJIS: Qudus International Journal of Islamic Studies*, *7*(1), 71–100. https://doi.org/10.21043/qijis.v7i1.4572

Adu, E. O., & Olatundun, S. O. (2007). Teachers' perception of teaching as correlates of students' academic performance in Oyo state, Nigeria. *Essays in Education*, *20*(1), 57–64.

Akkanat, Ç., & Gökdere, M. (2018). The effect of academic involvement and school climate as perceived by gifted students in terms of talent, creativity, and motivation in science. *Universal Journal of Educational Research*, *6*(6), 1167–1174. https://doi.org/10.13189/ujer.2018.060606

Berkowitz, R. (2022). School matters: The contribution of positive school climate to equal educational opportunities among ethno cultural minority students. *Youth & Society*, *54*(3), 372–396. https://doi.org/10.1177/0044118X20970235

Bronson, M. B., & Bronson, M. (2001). *Self-regulation in early childhood: Nature and nurture*. Guilford press. https://journals.sagepub.com/doi/abs/10.1177/1087054706295669

Copur-Gencturk, Y. (2015). The effects of changes in mathematical knowledge on teaching: A longitudinal study of teachers' knowledge and instruction. *Journal for Research in Mathematics Education*, *46*(3), 280–330.

Cortés Pascual, A., Moyano Muñoz, N., & Quilez Robres, A. (2019). The relationship between executive functions and academic performance in primary education: Review and meta-analysis. *Frontiers in Psychology*, *10*, 1582. https://doi.org/10.3389/fpsyg.2019.01582

Darling-Hammond, L., & Cook-Harvey, C. M. (2018, September 7). Educating the whole child: Improving school climate to support student success. *Learning Policy*

Institute. https://learningpolicyinstitute.org/product/educating-whole-child-report

Davis, J. R., & Warner, N. (2018). Schools matter: The positive relationship between New York City high schools' student academic progress and school climate. *Urban Education*, *53*(8), 959–980. https://doi.org/10.1177/0042085915613544

Dörnyei, Z., & Muir, C. (2019). Creating a motivating classroom environment. In X. Gao (Ed.), *Second handbook of English language teaching* (pp. 719–736). Springer. https://doi.org/10.1007/978-3-030-02899-2_36

Dulay, S., & Karadağ, E. (2017). The effect of school climate on student achievement. In E. Karadağ (Ed.), *The factors effecting student achievement* (pp. 199–213). Springer. https://doi.org/10.1007/978-3-319-56083-0_12

Evertson, C. M., & Weinstein, C. S. (2006). Classroom management as a field of inquiry. *Handbook of classroom management: Research, practice, and contemporary issues* (Chapter 1). Routledge. https://doi.org/10.4324/9780203874783

Freire, P. (2020). Pedagogy of the oppressed. In J. Beck, C. Jenks, N. Keddie, & M. F. D. Young (Eds.), *Toward a sociology of education* (pp. 374–386). Routledge. https://envs.ucsc.edu/internships/internship-readings/freire-pedagogy-of-the-oppressed.pdf

Godfrey, E. B., & Grayman, J. K. (2014). Teaching citizens: The role of open classroom climate in fostering critical consciousness among youth. *Journal of Youth and Adolescence*, *43*(11), 1801–1817. https://doi.org/10.1007/s10964-013-0084-5

Gustafsson, J. E., & Nilsen, T. (2016). The impact of school climate and teacher quality on mathematics achievement: A difference-in-differences approach. In T. Nilsen, & J. E. Gustafsson (Eds.), *Teacher quality, instructional quality and student outcomes: Relationships across countries, cohorts and time* (pp. 81–95). The Authors. https://doi.org/ 10.1007/978-3-319-41252-8_4

La Salle, T. P., Zabek, F., & Meyers, J. (2016). Elementary student perceptions of school climate and associations with individual and school factors. *National Association of School Psychologists.* https://www.nasponline.org/publications/periodicals/spf/volume-10/volume-10-issue-1-(spring-2016)/elementary-student-perceptions-of-school-climate-and-associations-with-individual-and-school-factors

López, V., Torres-Vallejos, J., Ascorra, P., Villalobos-Parada, B., Bilbao, M., & Valdés, R. (2018). Construction and validation of a classroom climate scale: A mixed methods approach. *Learning Environments Research*, *21*(3), 407–422. https://doi.org/10.1007/s10984-018-9258-0

Mega, C., Ronconi, L., & De Beni, R. (2014). What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *Journal of Educational Psychology*, *106*(1), 121–131 https://doi.org/10.1037/A0033546

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, *31*(2), 199–218. https://doi.org/10.1080/03075070600572090

Raidal, S. L., & Volet, S. E. (2009). Preclinical students' predispositions towards social forms of instruction and self-directed learning: A challenge for the development of autonomous and collaborative learners. *Higher Education*, *57*(5), 577–596. https://doi.org/10.1007/s10734-008-9163-z

Rapti, D. (2013). School climate as an important component in school effectiveness. *Academicus International Scientific Journal*, *4*(8), 110–125. https://doi.org/10.7336/ACADEMICUS.2013.08.06

Reyes, M. R., Brackett, M. A., Rivers, S. E., White, M., & Salovey, P. (2012). Classroom emotional climate, student engagement, and academic achievement. *Journal of Educational Psychology*, *104*(3), 700–712. https://doi.org/10.1037/a0027268

Sandahl, J. (2016). School climate and delinquency: On the significance of the perceived social and learning climate in school for refraining from offending. *Journal of Scandinavian Studies in Criminology and Crime Prevention*, *17*(2), 110–130. https://doi.org/10.1080/14043858.2016.1260335

Takahashi, T. (2018). Motivation of students for learning English in Rwandan schools. *Issues in Educational Research*, *28*(1), 168–186. https://www.researchgate.net/publication/323246179_Motivation_of_students _for_learning_english_in_Rwandan_schools

Wang, M. T., & Degol, J. L. (2016). School climate: A review of the construct, measurement, and impact on student outcomes. *Educational Psychology Review*, *28*(2), 315–352. https://doi.org/10.1007/s10648-015-9319-1

Wilson-Fleming, L., & Wilson-Younger, D. (2012). Positive classroom environments: Positive academic results. *Online Submission*. https://eric.ed.gov/?id=ED536465

Zedan, R. (2010). New dimensions in the classroom climate. *Learning Environments Research*, *13*(1), 75–88. https://doi.org/10.1007/s10984-009-9068-5

Zuković, S., & Stojadinović, D. (2021). Applying positive discipline in school and adolescents' self-esteem. *International Journal of Cognitive Research in Science, Engineering and Education: (IJCRSEE)*, *9*(1), 1–11. https://doi.org/10.23947/2334-8496-2021-9-1-1-11