






Article

Sustainable School Environment as a Landscape for Secondary School Students' Engagement in Learning

Agne Brandisauskiene ¹, Loreta Buksnyte-Marmiene ^{2,*}, Jurate Cesnaviciene ¹, Ausra Daugirdiene ¹,
Egle Kemeryte-Ivanauskiene ¹ and Rasa Nedzinskaite-Maciuniene ¹

- ¹ Educational Research Institute, Education Academy, Vytautas Magnus University, K. Donelaičio Str. 58, LT-44248 Kaunas, Lithuania; agne.brandisauskiene@vdu.lt (A.B.); jurate.cesnaviciene@vdu.lt (J.C.); ausra.daugirdiene@vdu.lt (A.D.); egle.kemeryte-ivanauskiene@vdu.lt (E.K.-I.); rasa.nedzinskaite-maciuniene@vdu.lt (R.N.-M.)
- ² Department of Psychology, Faculty of Social Sciences, Vytautas Magnus University, Jonavos Str. 66, LT-44191 Kaunas, Lithuania
- * Correspondence: loreta.buksnyte-marmiene@vdu.lt

Abstract: The sustainable school is important in today's education system to ensure the well-being of younger generations. This research work attempted to empirically test the different predictions of a sustainable school environment for secondary school students' engagement in learning. The following objectives were formulated: to analyse the differences of sustainable school environment and engagement in learning based on gender and SES background; to analyse the relationship between sustainable school environment variables and engagement in learning; and to examine how sustainable school environment variables could predict students' emotional and behavioural engagement. The research sample consisted of students from three districts of Lithuania with a disadvantaged SES context. We assessed the sustainable school environment variables and students' emotional and behavioural engagement in learning with the What Is Happening in this Class? (WIHIC) questionnaire, a short form of the Learning Climate Questionnaire (LCQ), and the Student Engagement Scale. The results showed a statistically significant difference in behavioural engagement between boys and girls. There are no differences in sustainable school environment variables and engagement in relation to SES. Teachers' autonomy supportive behaviour perceived by students has the strongest correlation with emotional and behavioural engagement in learning. Thus, in the Lithuanian schools surveyed, a sustainable school environment is developing.

Keywords: sustainable school environment; engagement in learning; secondary school; behavioural engagement; emotional engagement



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1. Introduction

The recent edition of OECD Education at a Glance 2021 [1] focuses on equal opportunities in education. Everybody agrees that the COVID-19 pandemic increased education inequality around the world, especially for students from low-income households, with disadvantaged social backgrounds or low socioeconomic (SES) backgrounds [2,3]. There is extensive scientific evidence that the pandemic caused significant learning loss among K-12 students [4]. McKinsey and Co [2] research data show that pandemic left students on average five months behind in mathematics and four months behind in reading by the end of the school year. Moreover, remote learning in COVID-19 conditions can affect school dropout rates, as well as widen social gaps in cognitive, social, and emotional skills of a student [5]. These authors argue that such inequalities may persist or even increase over time and have a negative impact on learning outcomes. Under these circumstances, the Sustainable Development Goals (SDGs)—ensuring “inclusive and equitable quality education and promote lifelong learning opportunities for all”—are even more urgent [6].

Schools are at the frontline to the achievement of the sustainable development goals and play a pivotal role in fostering social equity and justice.

Despite the difficulty of reaching a consensus in literature about a unifying concept of sustainable schools, the scientific community generally recognises that a sustainable school is one that is guided by the principle of care for oneself, each other (across cultures, distances, and time), and the environment (both far and near) [7]. There are different ways of approaching the task of building and developing a sustainable school and its environment, for example, as an integral, whole school approach [8]. Riordan and Caillier [9] argue that “the principles for a sustainable school fly in the face of our test-saturated culture, offering an alternative vision of what matters—not performance on standardized tests, but the purposeful interactions between people in diverse environments” (p. 152). Many authors [10] stress that the teacher–student relationship, peer cooperation, and supportive learning climate are important components of a sustainable school environment. As Birney and Reed [11] noted, schools that focus on sustainability create a more just and inclusive school and society, because they put an emphasis on the well-being of students and the school environment itself [8]. In sustainable schools, both the internal and external school environments are a welcoming, clean, healthy, and supportive place to learn. There is zero tolerance of bullying, cyberbullying, discrimination, stigmatisation, and/or social exclusion, as the school environment is the starting point for all learning [12]. A sustainable school environment focuses on developing emotionally strong and resilient individuals who can cope with complex challenges through pro-social behaviour that promotes human prosperity and the attainment of the sustainable development goals. However, so far, there is a lack of knowledge in the scientific literature on how the sustainable school environment affects students’ engagement in learning. Scientific studies show that students’ engagement in learning differs based on their individual differences, such as gender [13–18], their SES [19], and level of studies [18]. Hence, the focus of this article is to empirically test the different predictions of the sustainable school environment (student cohesiveness, teacher support, peer cooperation, equity, student’s perceived autonomy support) for secondary school students’ engagement (emotional and behavioural) in learning. More specifically, the following objectives were formulated: (1) to analyse the differences of a sustainable school environment and engagement in learning based on the sociodemographic characteristics of gender and socioeconomic (SES) background; (2) to analyse the relationship between sustainable school environment variables and engagement (emotional and behavioural) in learning; and (3) to examine how sustainable school environment variables could predict students’ emotional and behavioural engagement.

In order to achieve these goals, the constructs of a sustainable school environment and students’ engagement in learning are explained and discussed in the theoretical background section. In the methodology section, we provide specific information regarding the sample and its characteristics, measurement instruments, data collection, and analysis procedure. The results section is arranged according to the order of the research questions. In the final sections (discussion and conclusion), the results of our study are discussed in relation to previous studies and final conclusions are presented.

2. Theoretical Background

The basic function of the school is not only students’ cognitive development, but also socialisation. School as an educational institution not only provides knowledge and forms certain skills of the child, but also actively contributes to the child’s views and formation of values, the self, and other perceptions. The school environment acts as a landscape for teaching and learning processes and can have a positive or negative impact on them. A positive school environment creates conditions for students’ success, effective learning, and fewer behavioural and emotional problems [20], as well as generates circumstances for lower dropout probability [21,22]. Therefore, one of the school’s tasks is to find strategies and ways for the formation of a positive school environment. The principles of sustainable

school, on the basis of which a sustainable school environment is created, can serve this purpose.

The principles of sustainable school are aimed at creating well-being for all participants of the educational process. A sustainable school is described as one that is guided by “a commitment to care” [23]: care for oneself, each other (across cultures, distances and time), and the environment (both far and near) [7]. The main principles that pursue this goal are inclusion, active and equal participation of all children in learning processes [24,25], communication processes that remove barriers, and attitudes which are democratic, flexible, and responsive to future changes [23].

The very idea of sustainable school reveals an integrated approach to school as a system in which sustainability is integrated in all aspects of school life, not only in the physical environment [26]. In addition to the above-mentioned aspects, sustainability contains curricula, moral principles, relationships, and tools for capacity building, managing of processes, and creating coherence [27]. Moreover, sustainability is not a stable, fixed fact, it is a dynamic process having potential for change [28], and the school community is an active agent of the process that can influence its direction.

From this perspective, it can be assumed that the sustainable school concept reflects two theoretical paradigms: Bronfenbrenner’s ecological systems active interaction paradigm, emphasizing the importance of individuals’ interactions with the environment itself, as well as the interactions between different environments, for the development and behaviour of the individual; and Vygotsky’s socio-cultural theory, which states that the social environment and social context are very important for the child’s cognitive development and learning.

We propose to classify the characteristics of sustainable school into three general domains: (1) the pedagogic, (2) the social and organisational, and (3) the environmental–technical–economic [26]. This study focuses on the pedagogical and social aspects which are very important for the creation of a sustainable school environment.

The pedagogical domain includes curricula, teaching and learning processes, and tools for managing it. One of the main concepts of this domain, which has a big influence in the creation of the sustainable school environment, is sustainable learning. Sustainable learning could be understood as a meaningful process in which knowledge is co-created between students and teachers and shared in the community [24]. This is a learning strategy “which assures every participant has the access, support, materials, and safety they need to be active learners, are provided with opportunities for peer-to-peer learning, and are included in shaping the learning experience” [29]. Sustainable learning requires moving away from traditional, teacher-oriented, textbook-centred learning to more student-oriented learning [24]. This is the system in which teachers are encouraged to use participative teaching styles and need characteristics such as self-reflectiveness and high adaptivity to rapidly changing environments [24,29].

The social and organisational domain consists of different internal and school community relationships [26]. Teachers’ interpersonal competences, social emotional skills, and relationships with students acquire undoubted importance here [21,30]. Teachers can make an important contribution to achieving sustainable school goals and creating the sustainable school environment by using practices such as establishing a supportive learning culture; creating the feeling of connectedness for every member of the learning community [20]; empowering students to become active learners and active participants in learning process [24]; removing barriers to concentration, communication and information; and paving the way to creative, productive, and innovative learning [23].

Good relationships between teachers and students, cooperation among students themselves, teachers’ support for students, and students support for other students create the background for students’ engagement in learning [30] and better achievement [31], enhancing students’ empathy and critical thinking skills [24]. A collaborative school culture fosters a social justice ethos in that teachers can promote social equality by empowering all students [32].

Finally, we want to emphasise that a sustainable school creates positive consequences for all participants in the educational process, has impact on school community cohesion and its members relationships and well-being, and engages students in their learning, therefore improving motivation and behaviour [33]. A sustainable school environment is directed towards building emotionally strong and flexible individuals who can deal with complex challenges through prosocial behaviour that encourages human prospering and the attainment of the United Nations Sustainable Development Goals [30]. It creates a way to empower all students with a high-quality education [22] and is especially effective for high-need schools [21].

We recognise that there are so many variables referenced in the literature that involve a sustainable school environment; thus, we decided to leave only a few variables in our research which could be critical for students' engagement in learning process. Our chosen variable, students' perceived autonomy support, reflects the sustainable school pedagogical domain and cohesiveness in the social and organisational domain; the other three variables (teacher support, peer cooperation, equity) can be assigned to both areas. In our study, we hold the vision that the school should be seen as a system whose individual parts are tightly interconnected and interact with each other, making it difficult to draw dividing lines.

The relationship with the teacher as one of the essential variables is particularly important in the learning process. The whole learning process takes place through the inter-action of the teacher with the students and the students with each other [29]. In these interactions, as in the whole learning process, social and emotional factors are crucial for students' success [30]. Researchers emphasise teachers' support for students' correlation with students' engagement in learning and achievement [31]. The more stable, predictable, and supportive the learning environment and relationship with the teacher is, the greater the chances that students will succeed [34]. Research shows that students who feel the support of teachers have higher self-esteem and greater motivation for learning [35,36]. Thus, scholars recognise that the student-teacher relationship is critical to student's achievement and discuss whether this should not become one of the goals of education [37].

The quality of relationships is often related to another element of a sustainable school environment, peer cooperation, because learning in a supportive environment can promote the development of pro-sociality, rooted within a cooperative framework [38]. As McNerney [39] emphasises, school culture should reinforce collaborative relationships. On the other hand, a study by Israeli researchers [10] showed that the quality of collaboration among students also depends on the students' achievement of goals for themselves. Mastery-oriented students value cooperation with respect to their contribution to learning, friendship, and class cohesion, and are willing to cooperate with peers regardless of their social group membership. Performance-approach- and performance-avoidance-oriented students value cooperation with regard to its implications for social status and prefer to cooperate with peers of the in-group and with high-status peers [10].

The above factors create the conditions for equity, which is also an important element of a sustainable school environment, providing learning opportunities for students in the classroom. The role model of the teacher is very important in value education [40]. Thus, equity as well as other values can be taught through everyday communication and activities. Teachers can create the conditions for equity by empowering all students, creating a collaborative atmosphere in the class and inviting them to be active participants in the learning process [32]. Ulavere and Veisson [40] found that teachers think that it is important to teach children to have their own opinion and have the courage to voice it. The respect for diversity is the main value to be guided by teachers in interactions with students [32].

Finally, another important component of a sustainable school environment that helps to create learning conditions is perceived autonomy support. When teaching students, teachers typically use a particular style of motivation, which can be a style that supports student autonomy or a highly controlling style [41]. Research shows that the first (autonomous style) is associated with high student motivation, effective student engagement

in learning, and positive learning outcomes [42,43]. Accordingly, the second (controlling style) yields the opposite result: it is associated with low motivation of students, ineffective superficial learning, and low learning achievements [44,45]. Thus, it becomes clear that motivating behaviour of educators is a significant factor in student engagement in the teaching/learning process [43,46,47]. Summarizing all the components of a sustainable school environment discussed above, it can be seen that they are significant for students' engagement in learning.

The engagement in learning is a multidimensional meta-construct made up of distinct but integrated dimensions: cognitive, behavioural, and emotional [48]. Cognitive engagement is related to the learning strategies applied by the student, emotional refers to the emotions experienced during the learning process, and behavioural is the student's concentration, attention, and effort in learning [49]. In general, student engagement is associated with a positive learning state characterised by vigour, dedication, and observation. According to researchers [50], higher levels of student engagement connect with higher academic achievement and future success. As Estévez et al. [51] states, "students with the highest engagement had the best grades, and managed their time and study surroundings better, were the most strategic in seeking and managing information, and showed significantly less maladaptive regulatory behavior" (p. 11). Moreover, a meta-analysis of research by Lei, Cui, and Zhou [52] shows that among the three types of engagement, the average effect size was the highest between behavioural engagement and academic achievement, followed by the effect size for cognitive engagement, with emotional engagement being the lowest. These scholars state that student engagement differs substantially with an individual's cultural background, which in turn affects the relationship between student engagement and achievements. As stated by Tomaszewski et al. [19], low SES students show lower levels of engagement than other students and the effects of SES on achievement are partially mediated through student engagement. Comparing student engagement in terms of gender, a difference was also found—male students of different ages showed a tendency towards lower engagement [13–17]. For instance, Oga-Baldwin and Nakata found that male students showed a tendency towards lower engagement, lower internally regulated motives, and higher externally regulated motives [14].

Therefore, in our opinion, it is important to study how a sustainable school environment affects students' engagement in learning, ensuring inclusive and equitable quality education for all. Following the literature review, our first hypothesis is that a sustainable school environment could reduce the differences in students' engagement in learning based on gender and SES. Our second hypothesis is to expect that there is a positive relationship between sustainable school environment variables and students' engagement (emotional and behavioural) in learning. Our last hypothesis is that some of the sustainable school environment variables (student cohesiveness, teacher support, peer cooperation, perceived autonomy support, and equity) could predict students' emotional and behavioural engagement.

3. Materials and Methods

3.1. Participants

Convenience sampling was used for selecting participants. Four secondary education schools were selected in three districts of Lithuania. In 2019, according to Lithuanian State of Education Review [53], the schools of these municipalities were classified as those schools whose SES context is not very favourable, and a large number of students from low-income households study there. The communities in these schools have addressed the challenge of low student achievement, and for two years now, there has been a significant improvement in student achievement.

All students from grades 7–10, totalling 314 students from the above schools, were invited to volunteer for the study. The completed questionnaire was returned by 201 students (the return rate was 64%). Twenty-six questionnaires were incomplete and were therefore not included in the further analysis of the data. The sample consisted of 175 students

(56.6% girls and 43.4% boys) (Table 1). Most participants were in Grade 10 (29.1%), followed by Grade 7 (26.3%), Grade 8 (24.6%), and Grade 9 (20%). Some 39.4% of participants were low SES students, i.e., from low-income households and receive social support (free school meals).

Table 1. Sample characteristics.

	Boys		Girls		Total	
	n	%	N	%	n	%
7th grade	16	21.1	30	30.3	46	26.3
8th grade	22	28.9	21	21.2	43	24.6
9th grade	18	23.7	17	17.2	35	20
10th grade	20	26.3	31	31.3	51	29.1
Total	76	100	99	100	175	100

3.2. Instruments for Data Collection

We assessed the sustainable school environment with four subscales chosen from the What Is Happening in this Class? (WIHIC) questionnaire [54–56]. These subscales are student cohesiveness (sample item: “I am friendly to members of this class”), teacher support (sample item: “The teacher considers my feelings”), cooperation (sample item: “I share my books and resources with other students when doing assignments”), and equity (sample item: “I get the same opportunity to answer questions as other students”). Each subscale comprised 8 items and the items were scored on a five-point frequency scale with the alternatives of almost never (1), seldom (2), sometimes (3), often (4), and almost always (5) to indicate the degree of agreement with each statement. Table 2 shows Cronbach alpha coefficients for each subscale. In addition, we used a short form of the Learning Climate Questionnaire (LCQ) [57]. This questionnaire measures the extent to which the teacher applies motivational behaviours that support student’s autonomy. These are items related to a student’s perceptions on how their teacher supports the autonomy in the classroom; an example item is “I feel that my teacher provides me with choices and options”. The scale was scored on a 7-point Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree, with an intermediate score of 4 (moderately agree). Cronbach’s alpha coefficients for this scale are shown in Table 2.

Table 2. Cronbach’s alpha coefficients for each subscale.

	Student Cohesiveness	Teacher Support	Cooperation	Equity	Learning Climate	Affective Engagement	Behavioural Engagement
Cronbach’s alpha	0.915	0.928	0.906	0.931	0.929	0.892	0.832

To determine respondents’ emotional and behavioural engagement in learning, the Student Engagement Scale [16] was used. In this article, we present results according to two out of three subscales, namely Affective Engagement and Behavioural Engagement. An example of an Affective Engagement subscale item is: “I am happy to be at this school”. A sample item of a Behavioural Engagement subscale is: “I pay attention in class”. In this article, the results of the Affective Engagement subscale are referred to as emotional engagement. Each item of the subscales was rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s alpha coefficients for the Affective Engagement and Behavioural Engagement subscales are shown in Table 2.

Cronbach’s alpha results suggest that all subscales had an acceptable internal consistency (Table 2).

During the research, socio-demographic variables such as gender, grade, socioeconomic status, etc., were also collected.

3.3. Procedure and Ethics

Information about the study was first distributed among school principals and their permission was obtained. All students participated voluntarily and were free to fill out the data set. Questionnaires were completed anonymously, and confidentiality was guaranteed. The data collection was performed in May 2021. The research participants completed the self-report anonymous questionnaire on the online platform <https://apklausa.lt/> (accessed on 31 May 2021). Students filled in the questionnaire at home, at a time convenient to them, and thus, neither researchers nor teachers influence the answers. During data analysis, no tendency of research participants' answers was observed. The study procedures were carried out according to the Declaration of Helsinki. The Research Ethics Committee of the Education Academy of Vytautas Magnus University approved this study (protocol number SA-EK-21-03). Permission to use the questionnaires was obtained by the first author of this article.

3.4. Data Analysis

Statistical analyses were performed in IBM SPSS Statistics version 22.0 (IBM Corporation, Armonk, USA). Descriptive statistics are presented as the mean and standard deviation for continuous variables and number (percent) for categorical variables.

Normality of variables was checked with skewness and kurtosis of the distribution. Parametric statistics were calculated for variables with skewness < -1 or > 1 and kurtosis < -3 or > 3 . Research data analysis indicated that all variables were normally distributed and there were no extreme outliers; therefore, all data from 175 research participants was used for further analysis. Independent samples of Student *t*-tests were used to test for gender differences as well as differences between low and high SES students. To compare the size of these differences, standardised effect sizes (Cohen's *d*) were calculated. For Cohen's *d*, a value of 0.20 is interpreted as a small effect, 0.50 is a medium effect, and 0.80 is a large effect [58]. Pearson correlation analysis was used to investigate the possible relationship among student cohesiveness, teacher support, equity, peer cooperation, student's perceptions of autonomy support, and emotional and behavioural engagement. Cohen's criteria were used to interpret the strength of the observed correlations, wherein $r = 0.10 - 0.29$ was considered to be a small correlation, $r = 0.30 - 0.49$ a moderate correlation, and $r \geq 0.5$ a strong correlation [58]. A hierarchical multiple regression analysis examined the degree to which the independent variables (gender, SES, student cohesiveness, teacher support, peer cooperation, perceived autonomy support, and equity) could impact dependent variables (emotional engagement and behavioural engagement). In regression analysis, the effect size of the predictor variables is given by the beta loadings. In interpreting the effect, size gives the following guidance: $0-0.1 =$ weak effect, $0.1-0.3 =$ modest effect, $0.3-0.5 =$ moderate effect, and $>0.5 =$ strong effect [59]. To determine significance, an alpha level of 0.05 was used for all analyses.

4. Results

4.1. The Differences of Sustainable School Environment and Engagement in Learning Based on Gender

The results of the independent samples *t*-tests are summarised in Table 3. According to the results, no statistically significant difference was found for five variables in terms of gender.

The obtained scale averages in the samples of girls and boys are similar. However, a statistically significant difference was found between lower behavioural engagement means for the boys ($M = 3.24$, $SD = 0.59$) compared to the girls ($M = 3.55$, $SD = 0.60$; $t = -3.413$, $p < 0.001$). The effect size of this difference was medium (Cohen's $d = 0.52$).

Table 3. Student *t*-test findings for differences of variables in terms of gender.

		M	SD	t-Test	
				t	p
Student cohesiveness	Boys	3.96	0.79	0.205	0.838
	Girls	3.94	0.78		
Teacher support	Boys	3.34	0.94	0.051	0.959
	Girls	3.34	0.86		
Peer cooperation	Boys	3.39	0.82	−1.805	0.073
	Girls	3.62	0.79		
Perceived autonomy support	Boys	4.70	1.42	−0.074	0.941
	Girls	4.71	1.47		
Equity	Boys	3.88	0.87	−0.077	0.938
	Girls	3.89	0.88		
Emotional engagement	Boys	3.19	0.81	−1.897	0.059
	Girls	3.41	0.75		
Behavioural engagement	Boys	3.24	0.59	−3.413	0.001
	Girls	3.55	0.60		

4.2. The Differences of Sustainable School Environment and Engagement in Learning Based on SES

In order to test for the existence of group differences, Table 4 shows the results of Student *t*-tests corresponding to variables of the sustainable school environment (student cohesiveness, teacher support, peer cooperation, perceived autonomy support and equity) and emotional engagement and behavioural engagement. The test indicated that neither was significantly different.

Table 4. Student *t*-test findings for differences of variables in terms of students' SES background.

		M	SD	t-Test	
				t	p
Student cohesiveness	Low SES	3.87	0.80	−1.150	0.252
	High SES	4.00	0.77		
Teacher support	Low SES	3.39	0.93	0.637	0.525
	High SES	3.31	0.87		
Peer cooperation	Low SES	3.45	0.81	−0.867	0.387
	High SES	3.56	0.82		
Perceived autonomy support	Low SES	4.71	1.43	0.061	0.951
	High SES	4.70	1.46		
Equity	Low SES	3.78	0.87	−1.368	0.173
	High SES	3.96	0.87		
Emotional engagement	Low SES	3.29	0.72	−0.379	0.705
	High SES	3.33	0.82		
Behavioural engagement	Low SES	3.35	0.61	−1.059	0.291
	High SES	3.45	0.61		

4.3. Correlations between Sustainable School Environment and Students' Engagement in Learning

To identify associations between all variables, Pearson correlation coefficients were explored. Table 5 reports the statistically significant, positive linear correlations between students' engagement and its predictors used in the main regression analyses.

Table 5. Pearson correlation coefficient between variables predictors.

	Student Cohesiveness	Teacher Support	Peer Cooperation	Perceived Autonomy Support	Equity
Emotional engagement	0.505 **	0.554 **	0.551 **	0.599 **	0.519 **
Behavioural engagement	0.356 **	0.376 **	0.410 **	0.475 **	0.458 **

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Students' emotional engagement was significantly correlated to perceived autonomy support ($r = 0.599, p < 0.0001$), teacher support ($r = 0.554, p < 0.0001$), peer cooperation ($r = 0.551, p < 0.0001$), equity ($r = 0.519, p < 0.0001$), and student cohesiveness ($r = 0.505, p < 0.0001$). Students' behavioural engagement were also significantly correlated to perceived autonomy support ($r = 0.475, p < 0.0001$), equity ($r = 0.458, p < 0.0001$), peer cooperation ($r = 0.410, p < 0.0001$), teacher support ($r = 0.376, p < 0.0001$), student cohesiveness ($r = 0.356, p < 0.0001$). According to data shown in Table 5, it is perceived that autonomy support is most relevant to both emotional engagement (strong correlation) and behavioural engagement (moderate correlation).

4.4. Results of Regression Analyses

In the regression analysis, emotional engagement and behavioural engagement were used as the dependent variable of the study. The independent variables included gender, SES, student cohesiveness, teacher support, peer cooperation, perceived autonomy support, and equity. There were two binary variables: gender (girls = 1, boys = 0) and SES (high SES = 1, low SES = 0).

Hierarchical multiple regression analyses (Table 6, Step 1) indicated that gender and SES explained only 2% of the students' emotional engagement. The coefficient of determination $R^2 = 0.020$ ($F = 1.791, p = 0.170$), suggesting that the independent variables give almost no explanation about the variance of the variable, and that the regression model is not statistically significant.

Student cohesiveness and teacher support was added in Step 2. The obtained regression model is statistically significant ($R^2 = 0.403; F = 28.714, p < 0.0001$). It explains emotional engagement for 40.3% of students. It was found that student cohesiveness ($\beta = 0.314, t = 4.602, p < 0.0001$), teacher support ($\beta = 0.404, t = 5.939, p < 0.0001$), and gender ($\beta = 0.150, t = 2.492, p = 0.014$) were positive predictors of students' emotional engagement.

In Step 3, the peer cooperation and the perceived autonomy support, as two more predictors, were added. It was determined that regression model explained 51.4% of the students' emotional engagement ($R^2 = 0.514; F = 29.639, p < 0.0001$). There are three statistically significant predictors in this model: perceived autonomy support ($\beta = 0.409, t = 5.670, p < 0.0001$), student cohesiveness ($\beta = 0.254, t = 3.548, p < 0.001$), and gender ($\beta = 0.127, t = 2.277, p = 0.024$).

Equity was entered in Step 4 of the hierarchical multiple regression analyses. However, this predictor did not change the model. The coefficient of determination $R^2 = 0.514$ ($F = 25.260, p < 0.0001$). The best fitting model for predicting students' emotional engagement from the analysis above would be the linear combination of the constant, perceived autonomy support, student cohesiveness, and gender. The model is written by the following regression equation:

$$\text{Emotional engagement} = 0.441 + 0.221 \text{ AS} + 0.251 \text{ SC} + 0.200 \text{ G}, \quad (1)$$

where:

AS—perceived autonomy support;

SC—student cohesiveness; and

G—gender.

Table 6. Hierarchical multiple regression analyses for students' emotional engagement.

		Unstandardised Coefficients		Standardised Coefficients β	<i>t</i> -Value	<i>p</i> -Value
		<i>B</i>	Std. Error			
Step 1	(Constant)	3.186	0.109		29.132	0.001
	Gender	0.224	0.121	0.142	1.854	0.065
	SES	0.008	0.122	0.005	0.069	0.945
Step 2	(Constant)	0.765	0.258		2.967	0.003
	Gender	0.236	0.095	0.150	2.492	0.014
	SES	−0.006	0.097	−0.004	−0.064	0.949
	Student cohesiveness	0.314	0.068	0.314	4.602	0.0001
	Teacher support	0.353	0.060	0.404	5.939	0.0001
Step 3	(Constant)	0.446	0.240		1.861	0.065
	Gender	0.200	0.088	0.127	2.277	0.024
	SES	−0.031	0.088	−0.019	−0.351	0.726
	Student cohesiveness	0.255	0.072	0.254	3.548	0.001
	Teacher support	0.060	0.072	0.068	0.826	0.410
	Peer cooperation	0.149	0.076	0.155	1.957	0.052
	Perceived autonomy support	0.222	0.039	0.409	5.670	0.0001
Step 4	(Constant)	0.441	0.242		1.823	0.070
	Gender	0.200	0.088	0.127	2.274	0.024
	SES	−0.033	0.089	−0.020	−0.366	0.715
	Student cohesiveness	0.251	0.077	0.250	3.267	0.001
	Teacher support	0.056	0.076	0.064	0.743	0.459
	Peer cooperation	0.148	0.077	0.153	1.918	0.057
	Perceived autonomy support	0.221	0.040	0.407	5.486	0.0001
	Equity	0.011	0.075	0.012	0.145	0.885

A four-stage hierarchical multiple regression was conducted to examine the relationship between students' behavioural engagement and its predictors. From Table 7 (that is, Step 1 with gender and SES as predictors of behavioural engagement), $R^2 = 0.065$ was significant at $F = 5.940$, $p = 0.003$, since it could account for 6.5% of the variance. Gender ($\beta = 0.245$, $t = 3.270$, $p < 0.001$) was then a positive predictor of the students' behavioural engagement. Step 2, with four predictor variables (gender, SES, student cohesiveness and teacher support), was an improvement over the earlier model, with an R^2 change of 0.183; thus, 18.3% of the variance had been accounted for. The change in R^2 was significant ($F = 20.703$, $p < 0.0001$). This shows that the second set of predictors (teacher support and student cohesiveness) could predict students' behavioural engagement. It was determined that teacher support ($\beta = 0.268$, $t = 3.519$, $p < 0.001$), gender ($\beta = 0.250$, $t = 3.711$, $p < 0.0001$), and student cohesiveness ($\beta = 0.229$, $t = 2.988$, $p = 0.003$) were significant predictors.

The model in Step 3, with six predictor variables (gender, SES, student cohesiveness, teacher support, peer cooperation, and perceived autonomy support), gave a better value for $R^2 = 0.345$; thus, 9.7% of variance was accounted for. The change in R^2 was significant ($F = 12.451$, $p < 0.0001$). There are three statistically significant predictors in this model: perceived autonomy support ($\beta = 0.396$, $t = 4.722$, $p < 0.0001$), gender ($\beta = 0.234$, $t = 3.622$, $p < 0.0001$), and student cohesiveness ($\beta = 0.190$, $t = 2.289$, $p = 0.023$). The final model (in Step 4) comprising seven predictor variables gave an R^2 value of 0.362; again, 36.2% of variance was accounted for. The R^2 change was significant ($F = 4.555$, $p = 0.034$). The results showed that perceived autonomy support ($\beta = 0.356$, $p < 0.0001$), gender ($\beta = 0.238$,

$p < 0.0001$), and equity ($\beta = 0.204$, $p = 0.034$) were significant predictors of students' behavioural engagement. We can estimate students' behavioural engagement as follows:

$$\text{Behavioural engagement} = 1.605 + 0.294 G + 0.151 AS + 0.143 E, \quad (2)$$

where:

G—gender;

AS—perceived autonomy support;

E—equity.

Table 7. Hierarchical multiple regression analyses for students' behavioural engagement.

		Unstandardised Coefficients		Standardised Coefficients β	<i>t</i> -Value	<i>p</i> -Value
		<i>B</i>	Std. Error			
Step 1	(Constant)	3.212	0.084		38.437	0.0001
	Gender	0.302	0.092	0.245	3.270	0.001
	SES	0.050	0.094	0.040	0.531	0.596
Step 2	(Constant)	1.892	0.226		8.363	0.0001
	Gender	0.309	0.083	0.250	3.711	0.0001
	SES	0.040	0.085	0.032	0.466	0.642
	Student cohesiveness	0.179	0.060	0.229	2.988	0.003
	Teacher support	0.184	0.052	0.268	3.519	0.001
Step 3	(Constant)	1.662	0.218		7.641	0.0001
	Gender	0.289	0.080	0.234	3.622	0.0001
	SES	0.022	0.080	0.018	0.276	0.783
	Student cohesiveness	0.149	0.065	0.190	2.289	0.023
	Teacher support	−0.027	0.066	−0.040	−0.416	0.678
	Peer cooperation	0.081	0.069	0.107	1.135	0.246
	Perceived autonomy support	0.168	0.036	0.396	4.722	0.0001
Step 4	(Constant)	1.605	0.217		7.399	0.0001
	Gender	0.294	0.079	0.238	3.721	0.0001
	SES	−0.0001	0.080	0.0001	−0.001	0.999
	Student cohesiveness	0.098	0.069	0.125	1.428	0.155
	Teacher support	−0.071	0.068	−0.103	−1.036	0.302
	Peer cooperation	0.062	0.069	0.083	0.902	0.368
	Perceived autonomy support	0.151	0.036	0.356	4.193	0.0001
	Equity	0.143	0.067	0.204	2.134	0.034

Summarizing the results of hierarchical multiple regression, it can be stated that perceived autonomy support and gender predict students' emotional engagement and their behavioural engagement.

5. Discussion

The sustainable school concept is new but it is important in today's education system to ensure the well-being of younger generations. While some countries (United Kingdom, Sweden, Australia, etc.) have adopted the sustainable school as a policy goal [26], others, including Lithuania, are still taking the first steps in implementing sustainable school ideas in practice. Therefore, research on the importance of the components of a sustainable school environment in various aspects of student learning is significant, both theoretically and practically. This study attempted to empirically test the different variables of a sustainable school environment (teacher support, student cohesiveness, peer collaboration, equity, and

perceived autonomy support) for secondary school students' engagement (emotional and behavioural) in learning.

First of all, we found no gender differences with all sustainable school environment variables (teacher support, student cohesiveness, peer collaboration, equity, and perceived autonomy support). Our results show that boys' behavioural engagement means are statistically lower in comparison with girls. Such a tendency is noticed by many scientists [13–17,52,60]. It is clear that a variety of factors in the learning environment can be relevant to students' engagement. For example, scientific research has found that teachers have closer relationships with female students and more conflictual relationships with male students [61], the activity level boys bring to the classroom may be viewed as problematic [62], and there is a gender gap in perceptions of teacher support [63]. However, as already mentioned, in our study, we did not find statistically significant differences in terms of gender with sustainable school environment variables. In our researched schools, boys feel good at school, and they receive the support of teachers and friends; that is, it can be said that a sustainable school environment is created that ensures gender equality. We dare to assume that the only difference found between a student's gender and behavioural engagement can be explained by boys' lower learning motivation [64,65]. Lei with colleagues [52] noted that boys with good or poor grades may be less likely to engage in learning, because they see no point in demonstrating their learning abilities. Thus, we would like to emphasise that during this pandemic period, the focus on gender equality must remain relevant, as schooling during COVID-19 could create an even higher risk for boys' learning engagement compared to pre-pandemic conditions [60].

Secondly, the results of the study show that no differences in sustainable school environment variables and participation in learning were found in the studied schools in terms of SES. In our view, this is a particularly positive result in creating a culture of inclusive education, as many scholars find differences in exploring diverse aspects of student learning in this (SES) aspect. For example, teachers have more negative attitudes towards students with a low SES [66]; these students experience more social, emotional, and behavioural problems [67]; and student engagement differs substantially with an individual's cultural background [52]. In addition, it has been observed that earlier economic downturns have increased child poverty rates, with long-term consequences for children's health, well-being, and academic learning outcomes [68]. According to Jensen [69], students from low SES are more likely to struggle with engagement in learning for some reasons (health, vocabulary, effort, cognition, relationships), so a sustainable school environment may become a kind of mechanism to at least partially compensate for the difficulties experienced by these students.

Thirdly, the received results of the study suggest that students' emotional and behavioural engagement is most closely related to one of the variables of a sustainable school environment: students' perceptions of autonomy support. It turns out that the way the teacher behaves (giving the student autonomy or constructing it) during teaching is very important because it can strengthen or inhibit the active functioning of the students. Students need supportive conditions for their learning, recognizing their autonomy and competence, and building harmonious relationships [49]. When students are autonomously motivated, they begin to learn purposefully, characterised by intrinsic motivation, effort, and a sense that they control their own learning process [36]. Hence, among all sustainable school environment variables, students' perception of teachers' autonomy supportive behaviour has the strongest correlation with emotional and behavioural engagement in learning. This means that teachers, by being attentive and sensitive to their students, giving them autonomy increases students' potential engagement opportunities and it may enhance higher learning outcomes. These results are in line with other studies [45,49].

Fourthly, the results of this study help us better understand sustainable school environment influence, based on the analysis of hierarchical multiple regression analyses, on students' engagement in learning. It turns out that students' emotional engagement did not directly depend on gender and SES. However, if we include additional variables related to

student's personal relationships (student cohesiveness and teacher support) in the model, we see that not only these variables but also gender determine students' emotional engagement. By further looking for who can reliably predict the emotions a student experiences in the learning process and additionally including variables of learning abilities in class (peer cooperation and student's perceptions of autonomy support), a teacher's interpersonal relationship with students becomes less important as the importance of teacher autonomy-enhancing behaviours towards students' emotional engagement is revealed. In the fourth regression step, the inclusion of another sustainable school environment variable, equity, reveals that the researched phenomenon (students' emotional engagement) depends on the student's perceptions of autonomy support, student cohesiveness, and gender. Hence, our study confirms the importance of various sustainable school environment variables. Teachers' abilities to connect with students' diversity, listen to them, create a relationship, and provide them with autonomy emotional support are critical factors in strengthening emotional engagement in learning.

Fifthly, the analysis of the results showed that student behavioural engagement is gender-dependent but not SES-dependent. Thus, in secondary school, we can see not only a statistically significant difference between girls and boys in concentrating, focusing, and making efforts to learn, but gender as a sociodemographic characteristic becomes an indicator that can predict this. The second step of the regression revealed that the personal relationships of students with other peers are important for the engagement of students' behaviour, while the gender factor remains important. By incorporating classroom learning environment variables into the regression model (third step), students' cohesiveness remains important for behavioural engagement, but another predictor emerges—student's perceptions of autonomy support. The importance of this precise predictor for behavioural engagement remains even with equity present in class. Thus, the survey data reveal the significance of sustainable school environment variables, confirming their relationship with student engagement. The sustainable school environment variables allow us to predict the likely engagement of students. As can be seen, students' perceived autonomy support is important for both emotional and behavioural engagement. Cohesiveness is important for the emotional engagement of students, while equity is important for behaviour.

Finally, according to our study results, all sustainable school environment variables (i.e., student cohesiveness, teacher support, peer cooperation, equity, students' perceived autonomy support) are positively associated with students' engagement in learning. We want to emphasise the importance and significance of a sustainable school environment as it can become a landscape providing learning opportunities for all through inclusive and equitable quality education. When we aim to implement sustainable school environments in classrooms and schools, diversity is valued and every child is important and welcome. It must be stressed that the sustainable school environment is developmental. This environment is created at different stages, and the school community can play a decisive role through its actions inside and outside the classroom, with a huge impact on the future of all students. However, we would like to point out that different countries have different school cultures, family and community contexts, and therefore, the resolution of the sustainable school environment variables may not necessarily be the same in all cultures.

6. Limitations, Future Directions and Practical Implementation

This study has some limitations. Specifically, this research focuses on the analysis of emotional and behavioural engagement in learning and its connection with the sustainable school environment. Emotional engagement is potentially a mediator of behavioural engagement [18]; therefore, it seemed to us important to explore these dimensions of engagement. Obviously, it makes sense to explore the third dimension—cognitive engagement—as well, so we would see this as a further direction of research. Moreover, future research should take into account the possibility of including putative moderating variables in the relationships analysed to improve the explanation of the results obtained. These could be a student's self-achievement goals and external and internal learning motives.

The practical implementations of this study are to raise awareness among school communities about sustainable school environments. In order to create such an environment, from our point of view, the socio-cultural context in which learning takes place is very important. The motivation of learners of all ages to learn increases when they realise that the school or learning environment is the place to which they “belong” and the environment promotes their independence and agency. Therefore, the school community should first and foremost take care to create an emotionally supportive, non-threatening, and responsive learning environment. All learners should feel safe and valued, enabling them to reveal their competencies and further develop them. Changing school culture by creating a sustainable school environment fosters a social justice ethos and ensures inclusive and equitable quality education for all.

7. Conclusions

The results of the research show that there are no gender differences with all sustainable school environment variables (teacher support, student cohesiveness, peer collaboration, equity, and perceived autonomy support). Our results indicate statistically significant lower means only for boys’ behavioural engagement. Moreover, in relation to SES, differences in sustainable school environment variables and learning engagement in researched schools were not found. According to hierarchical multiple regression analyses on students’ engagement in learning, it became clear that students’ emotional engagement was directly dependent on students’ perceptions of autonomy support, student cohesiveness, and gender. Analysing students’ behavioural engagement by regression analysis, it became clear that gender and students’ perceptions of autonomy support remain important for behavioural engagement; in addition, another variable, equity, is also important. Hence, our research approves the importance of various sustainable school environment variables. We want to highlight the importance and significance of the sustainable school environment as it can become a landscape offering a wide range of learning opportunities for all through inclusive, equitable, and quality education.

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