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Research Article

Influence Of Academic Anxiety, School And Home Environment On Academic Achievement Of XII Standard Students: A SEM Analysis

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ABSTRACT

The study aims at solving the problem related to academic achievement of higher secondary students. The XII standard students at higher secondary schools face public examination undergo academic anxiety at school and home too. The school and home environment if not stress free then the amount of academic anxiety increases to a great extent which may be a hurdle to their academic achievement. The investigation is undertaken to find the influence of academic anxiety, school and home environment on academic achievement of XII standard students. The research method adopted was descriptive method using survey as a technique to collect the primary data from the respondents. The study sample size was 1627 students studying in XII standard in 32 schools in Tamil Nadu. Determination of sample was conducted by employing proportional stratified random sampling method. The study sample size was 1627 students studying in X and XII standards in 32 schools in Tamil Nadu. Determination of sample was conducted by employing proportional stratified random sampling method. The Cronbach's alpha reliability coefficients were used to measure the internal consistency of each measure and found the reliability coefficient for all the constructs of academic anxiety ranged between 0.789 and 0.719 and the composite reliability of the variable was 0.73. For all the constructs of school environment ranged between 0.892 and 0.713 and the composite reliability of the variable was found to be 0.89 and for all the construct of home environment ranged between 0.880 and 0.767 and the composite reliability of the variable was 0.83. Structural Equation Modelling (SEM) software package AMOS 20.0 was used in this research to explore statistical relationships among the test items of each factor and among the factors of independent variables (academic anxiety, school and home environment) and the dependent variable (academic achievement). The results indicate that the academic anxiety that significantly determined the students' academic achievement is significant at the level of (β=0.37, t-value=05.41, $p<0.001$). The school environment has significantly determined the students' academic achievement is statistically significant found at (β=0.66, t-value=9.27, $p<0.001$). The home environment has significantly determined the students' academic achievement found at the level of (β=0.57, t-value=4.78, $p<0.001$). Further, the academic anxiety, school environment and home environment have significant impact on higher secondary students' academic achievement.

Key Words: Academic Anxiety, Home and School Environment, Academic Achievement, SEM Analysis

Introduction

The present education system creates many threatening situations to increase academic anxiety of students. Anxiety is a psychological and physiological state characterized by somatic, emotional, cognitive and behavioural components Angel Jasmine Shirley. M, Diane Joseph R.(2014). Academic Anxiety is a broad term for a collection of anxieties that are experienced in school and at home related to the academics.

Academic anxiety occurs when a student experiences extreme and uncontrollable worry about events such as failure in exams, excessive concern about performance, competency and significant self-consciousness. Besides the teaching patterns of the school, there are other dimensions which enable successful academic achievement among students. It is not the material things concerned, the physical facilities and the methods of teaching and so on. It is also very much important that the students must feel safe, physical, social and emotional environment of the school is much more valuable for children's academic excel. Learners learn through interacting with their environment. Only in a favorable environment, the learner gets maximum concentration in his learning Nimmi Maria Oommen (2014). Learning of a child starts from home itself Nimmi Maria Oommen(2014). Home environment has great impact in the learning process of the child. Only in a favourable environment, the learner gets maximum concentration in his learning. Home is the first school for a child (Hana Morrissey, 2018). Home environment has great impact in the educational process of the students (Nimmi Maria Oommen, 2015). Students' performance can be better only in a favourable environment. Academic performance is the final product of learning (Nimmi Maria Oommen, 2014).
A responsive school climate, which involves parents and caretakers in the process of education, has a positive effect in the educational. Thus academic achievement aims to nurture a child and aid his professional, societal and personal growth which would be beneficial to the entire community. This can be achieved by the combined efforts of parents, educational institutions and educators. Studies indicate that children who do well in school come from families that provide supportive and enriching environment for learning at home. Studies have shown that student achievement can be affected either positively or negatively by the home and school environment. For success in academic achievement it is necessary to provide the students a positive environment at home and school. Flexibility and a supportive environment are essential for a student with academic anxiety disorder to achieve success in school. School faculty and parents together may be able to identify patterns of difficulty and develop remedies to reduce a child's challenges at these times says Caroline S. Clauss-Ehlers (2010).

Background of the Study

Sanjib Gahir (2024)states that among secondary school students 2.5% of them reported to have high levels of academic anxiety. Apoorva Shukla (2021) records that high academic anxiety and an unfavourable home environment reduces the efforts and motivation of the students in case of their academic achievement. Niti O. Khemka, Rajesh R. Rathod (2016) study reveals that female students and boys of government schools experience more academic anxious than their counterparts. Richard Kwabena Akrofi Baafi (2020) after analyzing the findings concluded that adequate school facilities provide a positive educational climate suitable for student learning. Barineka Lucky (2018) affirmed that the conducive school environment with adequate facilities and motivation enhanced students' performance. Olawale Abayomi Oniikoyi (2023) found no significant relationship between influences of the home environment on the academic performance of pupils in the Isolo local government area of Lagos state. Kamini P Sharma (2023) found significant relationship between home environment and Academic achievement. Adelifi Kaizirege & Upendo P. Biswalo (2023)recommends the need of strengthening parent-school cooperation, supervising and motivating children at home when they perform better in their studies. Nimmi Maria Oommen (2015) found significant correlation between home environment and academic achievement among higher secondary school students.

Significance of the Study

This research will provide the benefit to Higher Secondary students, parents and educators, school principal to deeply understand about the strength and weakness of their school and home environment. It will be attempted to show how problems of physical and emotional school and home environment can be addressed in order to increase the performance of Students. The study will guide the academicians to concentrate on removing anxiety among school children. Hopefully, the study will assist the Principals in schools to understand how home and school environment affects students' academic performance and assist the students to perform better. Also the students will be able to intervene in the case of poor performance to offset the negative effects of changing dynamics of the family.

Definitions of Operational Terms

Academic Anxiety

Academic anxiety is a state anxiety caused by the activation of sympathetic nervous system. Academic anxiety in this research it is meant that the scores of Academic Anxiety Scale with sub constructs Exam Anxiety, Classroom Anxiety, Language Usage Anxiety, Performance Anxiety and Anxiety towards Interaction with Teachers.

Home Environment

The emotional warmth displayed by parents while interacting with their children; provision of stimulating and learning experiences in the home; and physical surroundings, such as safety and cleanliness. Home environment in this study means the scores of Home Environment Questionnaire with sub constructs

Physical Home Environment, Emotional Environment, Social Environment, Academic Support and Parental Involvement.

School Environment

The school environment implies the physical, social, emotional, cultural and learning environment which supports and enhances learning. School environment in this study the researcher means the scores of School Environment School with sub constructs Supportive Atmosphere, Promoting Active Learning, Policy towards Emotional Environment, Promoting Creative Environment, Connecting School and Home Environment, Students Participation in Governance and Physical Environment.

Academic Achievement

It means the knowledge attainment or skills developed in the school subjects, usually determined by test scores or by marks assigned by teachers (Carter 1959). Academic Achievement in this study, the researcher means the average scores of half yearly examination and the final revision test of XII standard students.

XII Standard Students

The students in plus two classes in Schools of Tamil Nadu meant to be XII standard students.

Objectives

- To test the assumptions of Normality, Multicollinearity, Linearity and Homogeneity of the data
- To find out the influence of Academic Anxiety, School and Home Environment on Academic Achievement of Higher Secondary Students

Hypothesis

H1a There is significant influence of Academic Anxiety on Academic Achievement of XII standard Students
H1b There is significant influence of School Environment on Academic Achievement of XII standard Students
H1c There is significant influence of Home Environment on Academic Achievement of XII standard Students

Methodology

The research method adopted was descriptive method using survey as a technique to collect the primary data from the respondents. The study was empirical using both primary as well as secondary data. Secondary data analysis involved a wide range of literature review of published and unpublished sources including, journals and books and thesis of various scholars. The explanatory part of the research study was based on a field survey confined to the students studying in class XII during the academic year 2022-2023. The primary data was collected using Academic Anxiety Scale, Home Environment Scale and School Environment Questionnaire developed and validated by L.

Arul Suganthi Agnes and P. Muthupandi (2021). The academic achievement of the sample was collected from the school records. The average scores of half yearly examination and the final model examination before the public examination was computed. The research measures were developed initially through qualitative enquiry. Teachers, students, parents, head teachers, educationists and experts in the field are consulted. Metrics were generated as a result of the qualitative inquiry for all the three measures.

Then exploratory factor analyses were performed. For Academic Anxiety Scale six factors were derived out of which five factors had Cronbach's Alpha value greater than 0.7 and one miscellaneous factor did not meet the expected value. For School Environment Scale eight factors were derived out of which seven factors had Cronbach's Alpha value greater than 0.7 and one miscellaneous factor did not meet the expected value. For Home Environment Questionnaire six factors were derived out of which five factors had Cronbach's Alpha value greater than 0.7 and one miscellaneous factor did not meet the expected value. Structural Equation Modelling was performed in which confirmatory factor analyses had been applied to identify the items of each construct or variable and also evaluate the reliability and validity of each construct. Face validity, reliability and composite reliability were affirmed. The composite reliability values for all the constructs were greater than 0.63.This clearly shows that the reliability of the data is well established. The Average Variance Extracted values for all the constructs were greater than 0.5. This clearly shows that the validity of the data is well established.

The target population being the XII standard students studying in higher secondary schools of Tamil Nadu a sample of 1627 students responded to this study. The sample was drawn using stratified random sampling technique and the strata were type of school and school board. The data was collected from students of 32 schools distributed in 17 districts of Tamil Nadu. Statistical Package for Social Sciences (SPSS, version-20.0) was used for analysing the preliminary data. The Analysis Moment of Structures Software (AMOS, version-20.0) was used for Structural Equation Modelling (SEM) for measurement model analysis and structural model to test the proposed hypotheses.

Confirmatory Factor Analysis (CFA) Measurement Model

Confirmatory factor analysis is the prerequisite for path analysis. In confirmatory factor analysis, the researcher has to check content validity, composite reliability, convergent validity and discriminant validity. Item loadings of each construct have to be more than 0.5 to ensure the content validity (Hair, Black, Babin, Anderson, & Thatham, 2006). The value of AVE (Average Variance Extracted) demonstrates the convergent validity. AVE values for all constructs are equal to or more than 0.5 (Fornell and Larcker, 1981). Confirmatory factor analysis or measurement model for Academic Anxiety and its dimensions, School Environment and its dimensions and Home Environment and its dimensions are shown from the figure 1 to 3.

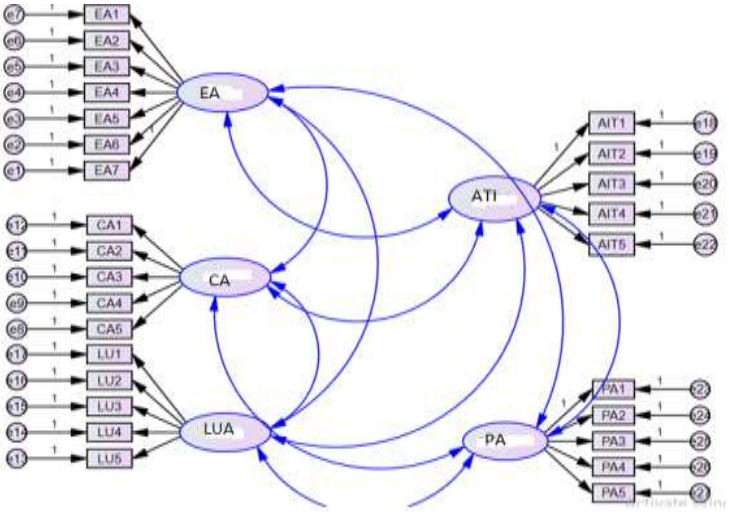

Figure 1 CFA for Academic Anxiety Dimensions

EA-Exam Anxiety; **CA**- Classroom Anxiety; **LUA**- Language Usage Anxiety;
PA- Performance Anxiety; **ATI** - Anxiety towards Interaction with Teachers

Table No. 1 CFA for Academic Anxiety Dimensions

Construct	(χ2) / df	GFI	AGFI	CFI	NFI	RMSEA
Academic Anxiety	2.82	0.96	0.92	0.90	0.93	0.05
Recommended Value	≤ 3	0.8 ≤ 1	0.8 ≤ 1	0.8 ≤ 1	0.8 ≤ 1	≤ 0.08

The value of goodness of fit indices for academic anxiety is presented in the above table. Normed Chi square value of 2.82 which is within the prescribed limit indicates model is very good fit. Goodness fit index (GFI) is 0.96 and Adjusted Goodness of fit index (AGFI) of 0.92 indicates that good fit, RMSEA value of 0.05 which is within the range indicating better model fit. CFI and NFI are 0.90 and 0.93 respectively indicating good fit.

Confirmatory Factor Analysis for School Environment Scale

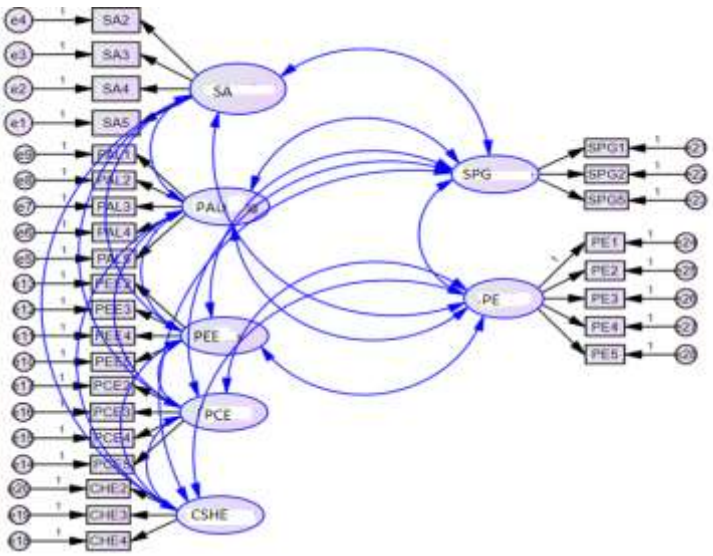

Figure 2 CFA for School Environment Dimensions

SA- Supportive Atmosphere; **PAL**- Promoting of Active Learning; **PEE**- Policy Towards Emotional environment; **PCE**- Promoting Creative Environment; **CSHE**- Connecting School and Home Environment; **SPG**- Students Participation Governance; **PE**- Physical Environment

Table No. 2 CFA for School Environment Dimensions

Construct	(χ2) / df	GFI	AGFI	CFI	NFI	RMSEA
School Environment	2.35	0.99	0.97	0.98	0.99	0.06
Recommended Value	≤ 3	0.8 ≤ 1	0.8 ≤ 1	0.8 ≤ 1	0.8 ≤ 1	≤ 0.08

The above table provides details about the value of goodness of fit indices for school environment dimensions. Normed Chi square value of 2.35 which is within the prescribed limit indicates model is very good fit. Goodness fit index (GFI) is 0.99 and Adjusted Goodness of fit index (AGFI) of 0.97 indicates that good fit, RMSEA value of 0.06 which is within the range indicating better model fit. CFI and NFI are 0.98 and 0.99 respectively indicating good fit.

Confirmatory Factor Analysis for Home Environment Questionnaire

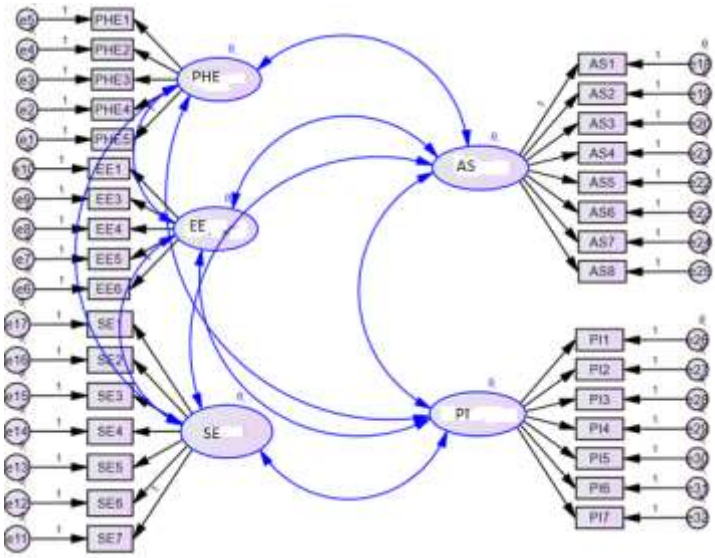

Figure 3 CFA for Home Environment Dimensions

PHE- Physical Environment; **EE**- Emotional Environment; **SE**- Social Environment; **AS**- Academic Support; **PI** - Parental Involvement

Table No.3CFA for Home Environment Dimensions

Construct	(χ2) / df	GFI	AGFI	CFI	NFI	RMSEA
Home Environment	2.92	0.93	0.89	0.95	0.95	0.05
Recommended Value	≤ 3	0.8 ≤ 1	0.8 ≤ 1	0.8 ≤ 1	0.8 ≤ 1	≤ 0.08

The above table provides details about the value of goodness of fit indices for home environment dimensions. Normed Chi square value of 2.92 which is within the prescribed limit indicates model is very good fit. Goodness fit index (GFI) is 0.93 and Adjusted Goodness of fit index (AGFI) of 0.89 indicates that good fit, RMSEA value of 0.05which is within the range indicating better model fit. CFI and NFI are 0.95 and 0.95 respectively indicating good fit.

Structural Equation Modelling (SEM) Analysis

The Structural Equation Modelling, popularly known as (SEM), is a statistical analysis technique developed for analysing the inter-relationships among the multiple variables in a model L. Arul Suganthi Agnes, Muthupandi P. (2024). The inter-relationships among the variables could be expressed in a series of single and multiple, regression equations L. Arul Suganthi Agnes, Muthupandi . (2024). It provides opportunity to study interrelationships among various independent and dependent variables at the same time (Hair et al., 2013). Further, relationship among dormant constructs and indicators ("measurement items") are corroborated by deploying CFA. This is termed as "measurement model" and hypothetical associations among constructs are verified using SEM (Hair et al., 2013).

A two-step approach had been adapted to execute SEM analysis. This approach is as per the recommendation advocated by past research (Anderson & Gerbing, 1988). The 1ststep includes the specification of "measurement model" by the identification of interrelationships amongst observed (indicator) and unobserved (dormant) factors. CFA had been executed for "measurement model" using SEM (AMOS Version.20.0) L. Arul Suganthi Agnes, Muthupandi P. (2024). The 2ndstep included the specification of the structural model with regards to the independent and dependent variables to test the hypotheses. The results of measurement model and structural model are presented as follows.

Checking Assumptions

The following section is process of checking the multivariate data analysis assumptions (Hair et al., 2010). Multivariate techniques having a set of assumptions that based on fundamental statistical theory. Although many assumptions or requirements come into play in multivariate statistical techniques, four of them potentially affect every multivariate statistical technique especially SEM which are given below.

1. Normality
2. Multicollinearity
3. Linearity
4. Homogeneity

Normality

Figure depicts the shape of the distribution of data and diagram of the histogram that compares the observed data with normal distribution.

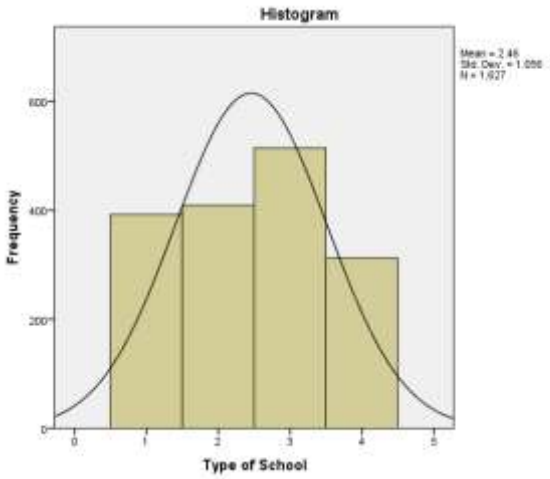

Figure: 4 Normality Plot

The above figure portrays that most of the data comes under normal distribution curve and hence, the data set is confirmed to be possessing normality. The data type of school has taken a sample which is reflected to all data in various groups for probing the normal probability plot, normality of data can be evaluated using statistical tests through Kolmogorov-Smirnov test. One-sample Kolmogorov-Smirnov test result are shown in the Table.No.4

Table No. 4Sample Kolmogorov-Smirnov Test

One-Sample Kolmogorov-Smirnov Test					
		EA	CA	LU	PA
N		843	1627	1627	1627
Normal Parameters [a,b]	Mean	20.50	16.43	19.78	20.77
	SD	4.757	3.317	4.507	4.429
Most Extreme Differences	Absolute	.072	.069	.064	.055
	Positive	.072	.057	.040	.054
	Negative	-.046	-.069	-.064	-.055
Kolmogorov-Smirnov Z		2.088	2.784	2.572	2.232
Asymp. Sig. (2-tailed)		.000	.000	.000	.000
a. Test distribution is Normal.					
b. Calculated from data.					

It can be inferred from the above table that the significant value is greater than 0.05. It means that data of each construct is possessing normal distribution properties.

Multicollinearity

Multicollinearity is important issue when researcher uses more than one independent variable to predict a dependent variable. If there is any relationship among independent variables then multicollinearity problem will be there. Collinearity Statistics contains Tolerance and VIF (Variance inflation factor). If value of VIF higher than five and tolerance level is less than 0.2 then it shows that presence of multicollinearity problem and Results of multicollinearity test are shown in Table No.5.

Table No. 5Multicollinearity

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	6.639	1.417		4.685	.000		
	CA	.226	.049	.159	4.607	.000	.828	1.207
	LU	.177	.038	.168	4.598	.000	.734	1.363
	PA	.121	.039	.112	3.131	.002	.774	1.293
	AIT	.196	.045	.156	4.364	.000	.765	1.306
	SA	.158	.079	.090	1.994	.027	.480	2.082
	PAL	-.095	.090	-.049	-1.057	.011	.461	2.167
	PEE	.093	.093	.043	1.001	.017	.521	1.918
	PCE	-.097	.071	-.054	-1.362	.000	.621	1.610
	CHE	.122	.093	.057	1.308	.000	.523	1.912
	SPG	-.011	.071	-.007	-.161	.002	.571	1.752
	PE	-.027	.045	-.027	-.613	.000	.504	1.985
	PHE	-.008	.137	-.003	-.057	.005	.323	3.093
	EE	-.158	.124	-.117	-1.274	.003	.317	8.534
	SE	.049	.109	.040	.447	.005	.223	8.160
	AS	.119	.110	.098	1.082	.000	.219	8.438
	PI	-.050	.128	-.036	-.393	.005	.437	8.567
a. Dependent Variable: EA								

The multiple regression analysis results displayed by Table 5 serves as testimony to the fact that there is no multicollinearity issues in the data set as the VIF value is less than 5 and tolerance level value is greater than 0.2.

Linearity

For checking the linearity in the data set for compare means (independent and dependent variable) was used and results of test in linearity are shown in Table.

Table No. 4.98 Linearity Testing-ANOVA

Variables			Sum of Squares	df	Mean Square	F	Sig.
School Environment and Academic Performance	Between Groups	(Combined)	109845.839	305	360.150	2.483	.000
		Linearity	1054.166	1	1054.166	7.268	.007
		Deviation from Linearity	108791.673	304	357.867	2.467	.121
	Within Groups		191315.915	1319	145.046		
	Total		301161.754	1624			

From the above table, it can be observed that the test for linearity results show the significant value in linearity. This indicates that the data possesses deviation from linearity (p=.121) significant value is greater than 0.05. Hence there is no linearity deviation from the variables and satisfying the linearity assumption. So data fulfils all the four assumptions related to multivariate analysis. Hence, structural equation model (SEM) can be aptly used for this data.

Homogeneity

Homoscedasticity is another of multivariate technique assumption that dependent variable demonstrate equal variance existence across the variety of predictor variables. For testing the homogeneity, Levene statistic was used to check the homogeneity issues and the homogeneity of variances are shown in the table No. 7.

Table No.7: Homogeneity

Constructs	Levene Statistic	df	Sig.
Exam Anxiety	.152	1625	.697
Classroom Anxiety	1.072	1625	.301
Language Usage Anxiety	.994	1625	.319
Performance Anxiety	4.160	1625	.042
Interaction with Teachers Anxiety	2.976	1625	.085

From the above table, it is observed that significant value is greater than 0.05. Hence, it can interpret that the five constructs does not have any homogeneity issues.

Measurement model and Confirmatory Factor Analysis

In this stage, the next step is to confirm the underlying factors through CFA. The CFA is acknowledged as measurement model permits specification of postulate the relations between the stated measurement items in relation to their underlying factors confirmatory with the subject matter of statistically testing. The measurement model for all constructs to be estimated based on some parameters include factor loadings, factor variances, covariance between the two factors, and variance of measurement errors. The analyses of CFA model is concerned with the extent to which the observed variables (factor loading) are generated by the underlying latent constructs within in the framework of SEM have been termed as measurement model (Byrne, 2010).To assess CFA model, two specifications to be employed. First, model fit is measured by looking into the "goodness-of-fit indices" and then second is observed by the "validity and reliability" of the research framework.

Test of Normality

Normality tests in social statics that can be used to decide if a data set is well-modelled by a normal distribution and to calculate how the data collected at random normally distributed. A common rule of normality test is to get the skewness and kurtosis of data. Skewness instrument is used in distribution analysis as a sign of asymmetry and deviation from a normal distribution. Skewness should always be within +2 to -2 range whenever data are normally distributed and kurtosis instrument is used in distribution analysis as a sign of flattening or "peakedness" of a distribution, kurtosis values always vary within +2 to -2 range when the data are normally distributed. Normality analysis has been done in this study with the help of SPSS 20.0, all the seventeen variables were tested by skewness and kurtosis statistics method and results found that all the items in the study are within +2 and -2 which are statistically significant and found normally distributed. Table 8summarises the results of normality test.

Table 8: Skewness and Kurtosis

S.NO	Constructs	Skewness	Kurtosis
1	Exam Anxiety	.262	-.309
2	Classroom Anxiety	-.042	-.166
3	Language Usage Anxiety	-.109	-.236
4	Performance Anxiety	.066	-.340
5	Anxiety Towards Interaction With Teachers	.028	-.165
6	Supportive Atmosphere	-.772	.609
7	Promoting Active Learning	-1.151	.877
8	Policy Towards Emotional Environment	-.949	.490
9	Promoting Creative Environment	-.602	-.551
10	Connecting School And Home Environment	-1.156	.790
11	Students Participation in Governance	1.716	25.933
12	Physical School Environment	-1.154	.962
13	Physical Home Environment	.264	-.106
14	Emotional Environment	.701	-.100
15	Social Environment	.501	-.958
16	Academic Support	.566	-.935
17	Parental Involvement	.559	-.966

Measures of Reliability and validity

Reliability of each indicator variable (measurement item) as well as the reliability of each construct is measured in order to determine the internal consistency (or homogeneity) of the instrument (R., Gopinath, 2020). By examining factor loadings the indicator reliability is assessed. Cronbach alpha (CA) and composite reliability (CR) (also known as construct reliability) the two indicators are used to assess constructs' reliability as suggested by Gopinath R. (2020), Fornell and Larcker (1981) (Gopinath., 2020,Xiayu Chen , Qian Huang , Robert M. Davison 2017). The most widely used measure to diagnose reliability of instrument is Cronbach alpha (Gopinath., 2020, Xiayu Chen , Qian Huang , Robert M. Davison 2017).

Cronbach alpha values are the measures to find the reliability of each items in this study (Fornell and Larcker (1981). The results confirmed that Cronbach alpha coefficients of all constructs are higher than minimum threshold limit of 0.7, indicating that each construct showed strong internal consistency as suggested by Gopinath, R., (2020), Xiayu Chen , Qian Huang , Robert M. Davison (2017). Thus, results of reliability test suggested that all the measuring dependent and independent variables of the defined conceptual research framework revealed a significantly acceptable reliability and confirmed for being reliable for the study.

Average Variance Extracted (AVE)

The other measure for checking the reliability of constructs was variance extracted; average variance extracted (AVE) is used to measure convergent validity proposed by Gopinath R. (2020), Fornell and Larcker (1981) as a measure of the shared or common variance in a latent variable-the amount of variance captured by the variable in relation to the amount due to its measurement error (Gopinath R.,2020, Dillon and Goldstein, 1984). The average variance extracted (AVE) value should be greater than 0.50 to verify the discriminant validity of constructs recommended by Gopinath R. (2020) and Hair *et al*., (2013).The results of average variance extracted (AVE) depicts that the value of AVE varied between 0.511 and 0.784 for all the Academic Anxiety constructs, between 0.540 and 0.688 for the School Environment constructs and between 0.514 and 0.664 for all the Home Environment constructs. The average variance extracted (AVE) from each latent construct exceeded the 0.5 threshold ranging from 0.50 to 0.78. The discriminate validity of the measures and their corresponding constructs were established.

Table 9: Average Variance Extracted (AVE)

S.NO	Constructs	AVE
1	Exam Anxiety	0.568
2	Classroom Anxiety	0.511
3	Language Usage Anxiety	0.561
4	Performance Anxiety	0.784
5	Anxiety towards Interaction with Teachers	0.545
6	Supportive Atmosphere	0.572
7	Promoting of Active Learning	0.688
8	Policy Towards Emotional Envi	0.555
9	Promoting Creative Environment	0.648
10	Connecting School And Home Envi.	0.540
11	Students Participation Governance	0.674
12	Physical School Environment	0.620
13	Physical Home Environment	0.580
14	Emotional Environment	0.514
15	Social Environment	0.435
16	Academic Support	0.664
17	Parental Involvement	0.564

Test of Validity

Convergent validity: Extent to which indicators of a specific construct coverage or share a high proportion of variance in common. To asses' convergent validity, Fornell and Larcker (1981) proposed examining (1) the item reliability of each construct (2) the composite reliability of each construct and (3) the average variance extracted (AVE) of each construct. Therefore, item reliability was assessed through maximum likelihood analysis component analysis as extraction technique with ProMax-rotation method for constructs using SPSS. According to Hair *et al.,* (2011) factor loading should exceed 0.5 levels of all individual items. Similarly Fornell and Larcker (1981) suggested composite reliability (CR) value be over 0.60 of all constructs and average variance extracted (AVE) value be greater than 0.50 in each dimension.

Table 10: Convergent Validity of Constructs

S.NO	Constructs	Composite Reliability
1	Exam Anxiety	0.794
2	Classroom Anxiety	0.840
3	Language Usage Anxiety	0.808
4	Performance Anxiety	0.816
5	Anxiety towards Interaction with Teachers	0.706
6	Supportive Atmosphere	0.889
7	Promoting of Active Learning	0.917
8	Policy Towards Emotional Envi.	0.833
9	Promoting Creative Environment	0.880
10	Connecting School And Home Envi.	0.779
11	Students Participation in Governance	0.861
12	Physical School Environment	0.906
13	Physical Home Environment	0.809
14	Emotional Environment	0.821
15	Social Environment	0.733
16	Academic Support	0.838
17	Parental Involvement	0.729

Thus it is stated that, among all the constructs in this study composite reliability, the value of all seventeen items had a CR value (see Table 10) between 0.706 and 0.917, and the results suggested that seventeen items possessed values of convergent validity or composite reliability, greater than the recommended value of 0.5 (Hair *et al.,* 2011). Furthermore, the output of validity test revealed that, the Average Variance Extracted (AVE) value of all the Exam Anxiety, Classroom Anxiety, Language usage Anxiety, Performance Anxiety, Anxiety towards Interaction with Teachers, Supportive Atmosphere, Promotion of Active Learning, Policy towards Emotional Environment, Promoting Creative Environment, Connecting School And Home Environment, Students Participation in Governance, Physical School Environment, Physical Home Environment, Emotional Environment, Social Environment, Social Environment, Academic Support and Parental Involvement constructs exceeds 0.5 which confirm item reliability of constructs. Therefore, it is concluded that there is enough confidence in the convergent validity, composite reliability and discriminate validity of Exam Anxiety, Classroom Anxiety, Language usage Anxiety, Performance Anxiety, Anxiety towards Interaction with Teachers, Supportive Atmosphere, Promotion of Active Learning, Policy towards Emotional Environment, Promoting Creative Environment, Connecting School And Home Environment, Students Participation in Governance, Physical School Environment, Physical Home Environment, Emotional Environment, Social Environment, Social Environment, Academic Support and Parental Involvement constructs.

Discriminant validity

Discriminant validity is evaluated by comparing the square root of average variance extracted (AVE) between two constructs with their respective inter-construct correlation measure (Fornell and Larcker, 1981). In this study, discriminant validity is confirmed in order to check, whether the square root of the AVE of each construct was greater than the highest correlation between the latent variable involving the focal constructs (Fornell and Larcker, 1981). Discriminant validity can be defined as the extent to which the measure being used will give scores and these scores should not be related to the scores attained from an unrelated measure Gopinath R. (2020). To establish discriminant validity, it needs to show the measures that should not be related are in reality not related. Thus, discriminant validity (Table 11) presents the inter-construct correlations and average variance extracted measures of each pair of constructs. Diagonal values represent square root of average variance extracted (AVE) and off diagonal values represent inter-construct correlation. Comparison of the correlations with variance extracted shows that all correlations between two constructs are less than square root of average variance extracted measures of both constructs. All diagonal values exceeded the inter-construct correlations, reflecting high level of discriminant validity to the acceptance level and substantial for further analysis. Thus, it is confirmed that all the constructs show strong evidence of discrimination.

Table 11 Discriminant validity of constructs (Academic Anxiety)

Cons.	**EA**	**CA**	**LU**	**PA**	**AIT**
EA	**0.92**				
CA	-0.26	**0.87**			
LU	0.53	-029	**0.83**		
PA	0.39	0.54	-0.24	**0.80**	
AIT	0.81	0.35	0.25	0.26	**0.86**

Discriminant validity of constructs (School Environment)

Cons.	**SA**	**PAL**	**PEE**	**PCE**	**CHE**	**SPG**	**PE**
SA	**0.86**						
PAL	0.35	**0.85**					
PEE	0.21	0.08	**0.79**				
PCE	0.30	0.17	0.37	**0.80**			
CHE	0.32	0.23	0.52	0.61	**0.81**		
SPG	0.14	0.03	0.68	0.41	0.63	**0.80**	
PE	0.12	-0.08	0.33	0.46	0.43	0.50	**0.74**

Discriminant validity of constructs (Home Environment)

Cons.	**PHE**	**EE**	**SE**	**AS**	**PI**
PHE	**0.71**				
EE	0.37	**0.71**			
SE	0.30	0.26	**0.74**		
AS	0.16	0.27	0.34	**0.81**	
PI	0.32	0.50	0.30	0.25	**0.75**

The assessment of model fit indices for the measurement model

The "goodness-of-fit" indices for "measurement model" have been discussed in the earlier section (Gopinath, Kalpana, Ramamoorthi, Karthikeyan, 2020). However, in CFA, various statistical measures are deployed to determine model fit to the data using AMOS (version 20.0) Gopinath, (2020). As in CFA, very initially the output presents the item loading are interrelated their latent constructs (Suchitra, Gopinath, 2020). Hair et al. (2011), Gopinath, (2020) advocated that factor loading should be above the common threshold value of 0.70 and the item loading should be in the range between 0.50 and 0.70 should be considered for exclusion from the scale only when eliminating the indicator Gopinath, Kalpana, Ramamoorthi, Karthikeyan, (2020). This leads to an increase in the composite reliability (Gopinath, Kalpana, Ramamoorthi, Karthikeyan, 2020). Moreover, retaining the low factor loading items in a model could cause the construct to fail Convergent Validity (Gopinath, 2020).

Standard loading and the squared multiple correlation

Bollen (1989) has proposed that standard loading and the squared multiple correlations among variables and constructs should be used in order for measurement model testing. A measurement model was set having hundred and six items with seventeen constructs in this study after using maximum likelihood as extraction technique with ProMax- rotation method showed that all ninety eight items were loaded highly on their corresponding factors and the factors which were not meeting the minimum level of acceptance and are cross loaded with other items were rotated or removed and provided the strong empirical evidence of their validity.

Parameter Estimates for the Measurement Model

Table No. 12

Constructs	**Item Codes**	**Standardized Loadings**	***t*- values[b]**	Squared Multiple Correlation
1.Exam Anxiety	EA1	0.94	-[a]	0.64
	EA2	0.94	14.02	0.72
	EA3	0.86	09.46	0.56
	EA4	0.83	14.4	0.59
	EA5	0.83	12.43	0.52
	EA6	0.86	12.32	0.49
	EA7	0.82	9.8	0.61
2. Classroom Anxiety	CA1	0.84	-[a]	0.57
	CA2	0.81	18.60	0.46
	CA3	0.94	11.97	0.49
	CA4	0.92	21.35	0.54
	CA5	0.90	22.16	0.65
3. Language Usage Anxiety	LUA1	0.84	-[a]	0.59
	LUA2	0.78	20.33	0.40
	LUA3	0.79	18.60	0.51
	LUA4	0.89	17.32	0.59
	LUA5	0.79	17.19	0.78
	LUA6	0.81	09.00	0.56
4. Performance Anxiety	PA1	0.86	-[a]	0.54
	PA2	0.80	20.88	0.74
	PA3	0.74	16.87	0.60
	PA4	0.79	21.2	0.56
	PA5	0.76	23.15	0.47
	PA6	0.81	24.16	0.65
	PA7	0.86	4.67	0.66
5. Anxiety towards Interaction with teachers	AIT1	0.84	-[a]	0.51
	AIT2	0.76	14.59	0.57
	AIT3	0.75	14.88	0.67
	AIT4	0.87	27.8	0.48
	AIT5	0.89	9.04	0.68
6. Supportive Atmosphere	OC 1	0.79	-[a]	0.48

	OC 2	0.83	16.36	0.54
	OC 3	0.80	19.61	0.46
7. Promoting of Active Learning	PA1	0.70	-[a]	0.50
	PA2	0.71	16.01	0.76
	PA3	0.86	15.30	0.40
	PA4	0.69	4.67	0.58
	PA5	0.72	27.8	0.75
8. Policy Towards Emotional Environment	PEE1	0.70	-[a]	0.67
	PEE2	0.74	13.93	0.48
	PEE3	0.85	13.26	0.54
	PEE4	0.82	22.28	0.46
	PEE5	0.80	19.4	0.54
9. Promoting Creative Environment	PCE1	0.80	-[a]	0.46
	PCE2	0.71	11.84	0.53
	PCE3	0.64	11.12	0.49
	PCE4	0.82	9.04	0.58
	PCE5	0.62	12.37	0.75
10. Connecting School And Home Environment	CHE1	0.67	-[a]	0.67
	CHE2	0.87	19.68	0.52
	CHE3	0.80	20.93	0.66
11. Students Participation in Governance	CP 1	0.75	-[a]	0.68
	CP 2	0.88	15.62	0.49
	CP 3	0.74	17.51	0.58
12. Physical Environment (School)	PE1	0.79	-[a]	0.53
	PE2	0.69	17.36	0.46
	PE3	0.78	21.85	0.53
	PE4	0.89	11.96	0.54
	PE5	0.65	14.40	0.60
13. Physical Environment (Home)	PHE1	0.62	-[a]	0.51
	PHE2	0.67	32.79	0.53
	PHE3	0.82	4.44	0.57
	PHE4	0.77	18.99	0.49
	PHE5	0.94	5.7	0.59
14. Emotional Environment	EE1	0.94	-[a]	0.72
	EE2	0.92	32.99	0.80
	EE3	0.64	5.7	0.59
	EE4	0.87	18.06	0.61
	EE5	0.91	7.93	0.62
	EE6	0.79	6.09	0.74
15. Social Environment	SE1	0.90	-[a]	0.55
	SE2	0.88	4.38	0.56
	SE3	0.91	13.77	0.76
	SE4	0.91	9.97	0.79

	SE5	0.97	3.51	0.50
	SE6	0.86	12.38	0.44
	SE7	0.89	6.72	0.66
16. Academic Support	AS1	0.83	-[a]	0.70
	AS2	0.74	6.64	0.70
	AS3	0.66	3.61	0.63
	AS4	0.68	16.83	0.68
	AS5	0.74	4.04	0.53
	AS6	0.86	12.31	0.57
	AS7	0.83	8.73	0.70
	AS8	0.94	11.58	0.77
17. Parental Involvement	PI1	0.88	-[a]	0.59
	PI2	0.79	11.65	0.58
	PI3	0.78	5.85	0.53
	PI4	0.66	7.62	0.62
	PI5	0.96	18.06	0.75
	PI6	0.67	7.79	0.49
	PI7	0.81	18.06	0.72

a: Indicates a parameter fixed at 1.0 in the measurement model.
b: All Critical Ratios (t-values) are significant at 0.05.

The examination of measurement model indices shows that all the Academic Anxiety dimensions, Exam Anxiety Classroom Anxiety, Language Usage Anxiety, Performance Anxiety, Anxiety towards Interaction with Teachers, School Environment dimensions Supportive Atmosphere, Promoting Active Learning, Policy towards Emotional environment, Promoting Creative Environment, Connecting School and Home Environment, Students Participation in Governance ,Physical Environment, Home Environment dimensions, Physical Environment, Emotional Environment, Social Environment, Academic Support and Parental Involvement constructs were loaded highly on their corresponding constructs (p = 0.05 in all cases) and the t-values of those items were greater than 2.0 (Segars and Grover, 1993). This means overall, the items shared substantial variance with their hypothesized constructs. The t-value for the loadings ranged from 4.04 to 32.99 demonstrating adequate convergent validity.

The fit of the Measurement Model

In terms of, measurement model indices as shown in (Table 13). The results of CFA indicated that measurement model fit statistics had 1216 degree of freedom, an acceptable fit to the data, χ^2 value of 2833.91 with a degree of freedom of 1768 for the measurement model were found and results concluded that Chi-square and degrees of freedom in this study is acceptable with a value of 2.330 which demonstrates model fitness.

The goodness of fit statistics indicates that all the criteria meet the recommended value (Gopinath R.et.al. 2020). The results of measurement model presents that GFI=0.92, AGFI=0.90, CFI=0.93 RMR= 0.06, RMSEA=0.05 and provides a strong evidence for fitness of model (Gopinath, R. et.al. 2020). However Normed Fit Index (NFI) is lower than the recommended value of 0.90 but are close to it therefore it could be expressed that the measurement model of this study had acceptance level of fitness because NFI is very close to recommended value and all other indices met the recommended minimum value of acceptance (see Table 10).Thus, fit statistics confirmed that the measurement model showed adequate fit with the data, indicating no further modification in the model is required Gopinath, (2020. Hence, the unidmensionality of the model is established (Byrne, 2010; Hair *et al.*, 2013, Kalpana., 2018).

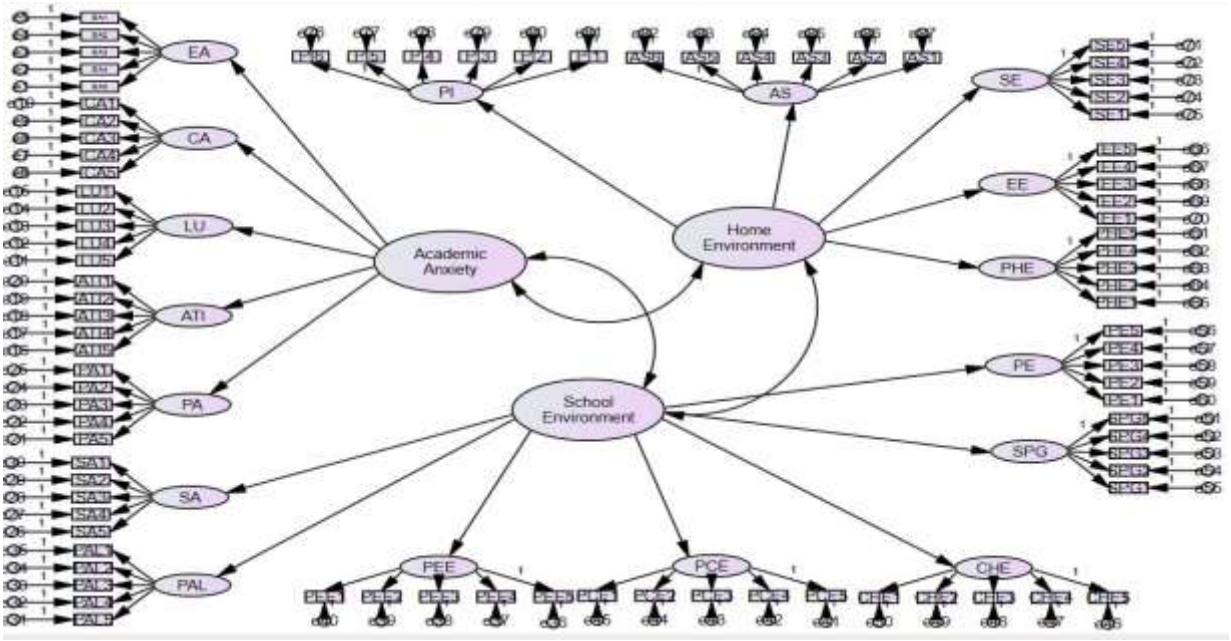

Figure 5 Confirmatory Factor Analysis of AA, SE and HE

Table 13: Reported Values of Model Fit for the Measurement Model

Fit Measure	Recommended Values	Values from the Model	Conclusion
Chi-square (χ^2)/ *p*- value	$p \geq 0.05$	0.00	Not Fit
Chi-square (χ^2) / *df*	≤ 3.00	2.57	Fit
Goodness of Fit (GFI)	≥ 0.90	0.92	Fit
Adjusted Goodness of Fit (AGFI)	≥ 0.80	0.89	Fit
Norm Fit Index (NFI)	≥ 0.90	0.86	Moderately Fit
Comparative Fit Index (CFI)	≥ 0.90	0.93	Fit
Root Mean Square Residual (RMR)	≤ 0.09	0.05	Fit
Root Mean Square Error of Approximation (RMSEA)	≤ 0.10	0.05	Fit

Structural Equation Modelling (SEM) analysis and Testing of Hypotheses

In the second step of structural equation modelling (SEM), confirmed measurement model is specified into the structural model based on the relationships proposed in the research model of this study. The structural model is evaluated to assess the model fit and to test the hypothesised casual relationships between latent constructs and measured variables to the nature and magnitude of the relationship between constructs (Hair *et al.,* 2013). Structural equation modelling (SEM) is used in this study to estimate parameters of the structural model in Figure 5, and the completely standardized solutions computed by the AMOS 20.0 were used to run the structural model and test the hypothesised relationship between constructs. Moreover, maximum likelihood estimation and correlation matrix method were adopted to check the structural model and test hypotheses framed for the study. The model fit-statistics for the structural model indices of all the Exam Anxiety, Classroom Anxiety, Language usage Anxiety, Performance Anxiety, Anxiety towards Interaction with Teachers, Supportive Atmosphere, Promotion of Active Learning, Policy towards Emotional Environment, Promoting Creative Environment, Connecting School And Home Environment, Students Participation in Governance, Physical School Environment, Physical Home Environment,

Emotional Environment, Social Environment, Social Environment, Academic Support and Parental Involvement variables were shows a good fit with the data. Hu and Bentler (1999). Gopinath, et.al.(2020) mode fit criteria is applied for structural equation model testing were: Chi-square statistics (χ^2), Chi-Square χ^2/df, Goodness of Fit (GFI), Adjusted Goodness of Fit (AGFI), Norm Fit Index (NFI), Comparative Fit Index (CFI), Root Mean Square Residual (RMR), and Root Mean Square Error of Approximation (RMSEA) to determine the goodness-of-fit between the hypothesised model and the data. The rule of thumb considering acceptable model should have Chi-square ≥ 0.05, χ^2/df, ≤ 3, RMSEA ≤ 1.0, and GFI and CFI greater than 0.90 and AGFI Value above .80, Norm Fit Index (NFI) ≥ 0.90 and Root Mean Square Residual (RMR) ≤ 0.09 (Hair *et al.,* 2013). Overall the structural model showed adequate fit with the data (Gopinath R., 2020). The proposed structural model shows a good fit with the data. The analysis of structural model generated a chi-square of 4233.98 with a degree of freedom 1732 which is less than 3.00 and meet the recommended value of Chi-square (χ^2) / *df*. The P-value of χ^2 is 0.00, which does not meet the criteria for a fit model *p*-value should

be ≥ 0.05. However, this could be because of the larger number of indicators and large number of sample size in the study. All of the fitness measures indicated that the structural equation model was acceptable and meeting the recommended values: Chi- square χ^2/df, = 2.45, GFI ≥ 0.94, CFI ≥ 0.96, (Gopinath R., 2020) AGFI = 0.90, Norm Fit Index (NFI) = 0.94, CFI= 0.96 and Root Mean Square Residual (RMR) = 0.07 surpassed the minimum recommended values suggested by previous studies (Gopinath R., 2020, Hair *et al.,* 2013; Hu and Bentler, 1999).

Table 14: Reported Values of Model Fit for the Structural Model

Fit Measure	Recommended Values	Values from the Model	Conclusion
Chi-square (χ^2)/ *p*- value	$p \geq 0.05$	0.00	Not Fit
Chi-square (χ^2) / *df*	≤ 3.00	2.45	Fit
Goodness of Fit (GFI)	≥ 0.90	0.94	Fit
Adjusted Goodness of Fit (AGFI)	≥ 0.80	0.90	Fit
Norm Fit Index (NFI)	≥ 0.90	0.94	Fit
Comparative Fit Index (CFI)	≥ 0.90	0.96	Fit
Root Mean Square Residual (RMR)	≤ 0.09	0.05	Fit
Root Mean Square Error of Approximation (RMSEA)	≤ 0.10	0.07	Fit

Path analysis (Hypothesis testing)

After establishing an acceptable structural model, the statistical significance of the parameter estimates from structural equation model (SEM) are evaluated by examining path estimates and critical ratio (CR) or *t*-value. When the CR value is greater than ±1.96 at 0.05 level of significance then the parameter estimate is considered statistically significant (Abdalla Ahmed Hassan AlAli, Norlaile binti Salleh Hudin, 2022, Hair *et. al.*2013). Furthermore, standardised path coefficients β value is examined as per the recommendation of Gopinath R. (2020), Cohen (1988). As per Cohan (1988) Gopinath (2020), a standardised coefficient value of less than 0.10 might indicate a small effect, a value around 0.30 a medium one and a value around 0.50 indicate a high effect.

Structural Model or Path Analysis (12th Standard Performance)

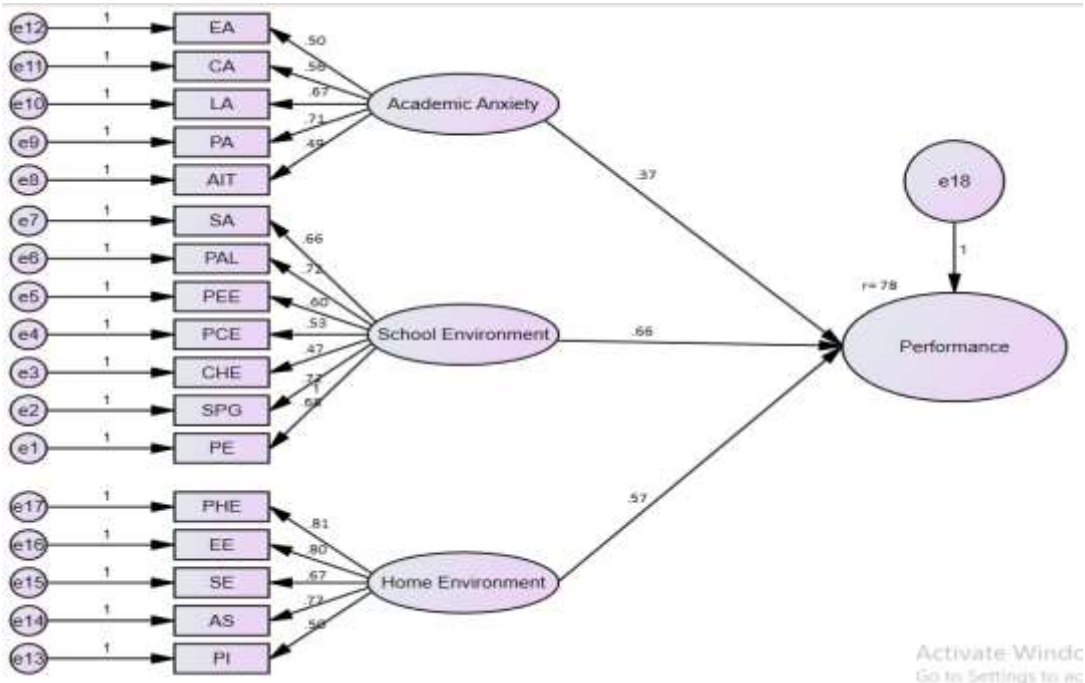

Figure:6 Standarized Path coefficients

After assessment of the model adequacy of both CFA and structural model, hypothetical relationships should be examined. The outcomes of regression path coefficients are depicted in Table No.15.The hypothetical relationship statistically is found through assessment by the consideration of the regression weight estimates and critical ratios relation with seven latent path coefficients are found statistically significant with critical ratio (t-values) is greater than ± 1.96 significant at 0.001The result of study indicate that hypotheses, H1a, H1b and H1c are accepted and found to be statistically significant since their respective *p*-values are significant at 0.001. So that, the factors viz., academic anxiety, school environment and home environment

dimensions have found to significantly determine the students' academic achievement from a Higher Secondary School student's perspective. In order of preference, the results indicate that the academic anxiety has significantly determined the students' academic achievement is significant at the level of (β=0.37, t-value=05.41, p<0.001). The school environment has significantly determined the students' academic achievement is statistically significant found at (β=0.66, t-value=9.27, p<0.001). The home environment has significantly determined the students' academic achievement found at the level of (β=0.57, t-value=4.78, p<0.001). Further, the academic anxiety, school environment and home environment have significant impact on higher secondary students' academic achievement. The hypothesis H1a, H1b and H1c are found to be statically significant at *p*-value 0.001.

Table 15 The Standardized Regression Path Coefficients and its Significance Level

Construct	Code	Hypothesized Relationship	Standardized Regression Weight (β)	Standard Error (S.E)	Critical Ration (t-value)	*p*-value	Decision on Hypothesis
Exam Anxiety	EA	EA → AA	0.37	0.031	5.41	***	Accepted
School Environment	SE	SE → AA	0.66	0.073	9.27	***	Accepted
Home Environment	HE	HE → AA	0.57	0.043	4.78	***	Accepted

Note: *** denotes the *p*-value significant at 0.001

With respect to the statistical significance of the study results supported the proposed research model (Figure 5) and hypothetical relationship among the various dimensions. The standardized regression path coefficients and its significance level academic anxiety, school environment and home environment have shown strong predictor.

Conclusion

The research measures used in the research have a high degree of reliability and validity and also the scores of discriminant validity exhibit very little inverse connection. A Structural Equation Model (SEM) was created in order to examine the effect of academic anxiety, home and school environment on academic achievement of XII standard students in Tamil Nadu. It is concluded that the effects of academic anxiety, home and school environment is effective in predicting academic achievement of XII standard students in Tamil Nadu. According to the data, school and home environment is a stronger and more reliable predictor of academic achievement than the academic anxiety. Similar study by Abisola Moradeyo Adeyemi, Semiu Adeyemi (2014) supported the present study and confirms that home environment; parental support and study habits were significant predictors of students' academic achievement. McNair R., Johnson H.D.(2009) rationalise by their finding that adolescents' perception of school quality and time parents spend with them are high predictors of academic achievement. The findings obtained demonstrate that promotion of active learning and students' participation in governance has effectively contributed to school environment. Also physical home environment, emotional environment and academic support of parents at home have great contribution to home environment which

This result requires future research to be conducted to define new variables more in number related to school and home environment and academic achievement with a structural equation model to be formed. It is to be remembered that the results of a structural equation model is always limited to the variables and factors determined within the model content. The survey data were collected from only one state from India, the generalizability of the results is limited. In this study self-reported data was used and the researcher admits that this might have caused subjectivity and biases in the relationships between the variables. To conclude the study is successful in its original form provides a holistic approach to comprehend the academic achievement and aims to improve academic success of students appearing for public examination.

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