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Delaware School Climate Scale: its Factor Structure, Reliability and Validity in the Indian Context

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ABSTRACT:

Validating the Delaware School Climate Scale for senior secondary students in an Indian setting was the goal of this study. Originally, the scale was designed by George G. Bear. India's Punjab was the site of this investigation. A sample of 300 senior secondary pupils from various educational institutions was gathered. EFA and CFA led to the creation of two scale factors. At standardised norms, the values of the various estimations were significant. In Principal factor analysis the value of KMO is acceptable and p value is significant at .05. The estimations of various parameters were high at normalized standards. The value CMIN/DF, RMSEA, RFI, IFI, CFI and TLI were found to be acceptable according to the threshold values. The reliability of the tool in the Indian context was very good and acceptable. This scale was well adapted in the Indian context as all the estimates were found to be good acceptable. An intensive study on school climate in India is the need of the hour. By using this scale, we can study the variations and various trends in academic performance of students in Indian context and can help the policy makers and school administrators to solve the problems of the students.

Keywords: School Climate, psychological problems, validation, senior secondary students, reliability

1. Introduction

In the last few decades many schools start interventions to improve the environment of the school. The primary concern of these interventions is to improve the mental health of the students. Moreover, it also helps to solve the behavioural issues of the students. The term "school climate" is a broad term and it includes academic and administrative climate. It also deals with the safety of the students in the institution. Furthermore, the likeness of the school, emotional security, rules and regulation etc. are the various elements of the climate. Development of the pupils in the institution is significantly affected by the school environment in different aspects (Hackman, et al., 2022). A favourable school climate helps the society to solve the various health problems of the students (Zou, et al., 2022). To develop a favourable climate in the school is the major concern of the society. There are many theories about developing a favourable climate in the school. Many studies revealed that the school climate is very complicated concept and have many aspects. School climate helps the students to improve their engagement which consequently improves the academic performance of the students (Tomaszewski et al., 2024).

2. Review of literature

Previous researches on school climate signifies that school climate is a potent predictor of academic achievement of the students (O"malley et al., 2015; Reynolds et al., 2017; Ruiz, 2018; Konold et al., 2018; Zysberg and Schwabsky, 2020; Burch, 2020; Damirtas-Zorbaz et al., 2021). Moreover, from the literature review it is evident that, school climate also related to emotional engagement of the students. there is a direct relationship between climate of the school and emotional engagement (Konold et al., 2018; Bear et al., 2018). Furthermore, self-efficacy of the students was also found to be influenced by school climate. More favourable climate of the school, enhances the self-efficacy of the students (Fan and Williams, 2018). It is also helpful in reducing the mental health problems and behavioural disorders in the students. It is observed that the students show less behavioural problems and mental disorders when the school climate is more favourable (Salle et al., 2018). School climate greatly effects the learning process of the pupils (Ariyanto and Umamah, 2019). Additionally, literature review indicates that, mental health of the students is negatively correlated with a supportive school climate (Franco et al., 2022). Thus, we can conclude that, a favourable school climate is very important for the teaching learning process and to improve the academic achievement of the students. There is an ample space for further research in this variable. School climate can study as an independent variable with academic buoyancy.

3. Need for the validation of tool in Indian context

The school infrastructure in India is not up to the mark. This is due to the mushrooming of public and private school in the Country (Majra and Gur, 2010). Many schools do not bother about the important issues like; mental health of the students, training of the teachers, etc. (Parikh et al., 2019). A survey revealed that may Indian schools do not have the safe building, proper water facilities and secure environment (NCPCR, 2019-20). So, there is a great need to carry out research on the climate of the schools and a good and reliable tool is required to comprehend the environment of the institute from the perception of a student. The careful study of literature revealed that the tools that were used in the research in India were not updated. There were so many issues regarding construct validity of the scale (Pestonjee, 1997) and insensitive approach towards cultural needs (Mehrotra, 2005).

Sr. No	Name of the scale	Response type	Reliability	Validity
1	School environment measuring scale-Hindi	5-point Likert scale	Split-half = 0.64; test-retest = 0.64	Concurrent validity = 0.90
2	Academic climate descriptive questionnaire	Description	Split-half = 0.85; test-retest = 0.78	only face validity reported
3	Classroom environment scale	4-point Likert scale	Split-half = 0.84; test-retest = 0.85	content validity reported
4	School organisational climate descriptive questionnaire	4-point Likert scale	Internal consistency = high, reported by KR-20 formula	content and face validity
5	*School climate scale	5-point Likert scale	Split-half = 0.89 spearman-brown prophecy = 0.92	content and construct validity reported
6	**School Climate Scale	5-point Likert scale	Spearman's Brown Prophecy Formula = 0.72	validity coefficient = 0.83.

*Vats (2019); **Bhat and Mir (2018)

Table 1: Showing the type of response and values of reliability and validity

There are many tools available, but these tools are not reliable and comprehensive. The "school environment measuring scale-Hindi" is a situational test and conducted by the school counsellor. It includes the dimensions; Creative stimulation vs suppression; Cognitive and encouragement vs retribution; Permissiveness vs strict control. Another scale used to assess the school climate was "Academic climate descriptive questionnaire". It consisted of 84 items and suitable for the students of age 13 to 18 years. The dimensions of the scale were: punishment Physical material; inter-personal trust; school provision; academic provision. One more scale used was "Classroom environment scale". It was adopted from Moos and Tricket scale of school climate. The scale included 90 items and suitable for the high school students. the dimensions of the scale were: relationships; system maintenance and personal development (Pestonjee, 1997). The most frequently used scale was "School organisational climate descriptive questionnaire". It was adopted from Halpin and Croft scale. The number of items in this scale was 64 and it was suitable for teachers. It assessed the observation of the educators about the environment of institute (Malhotra, 2005). Another scale was developed by Dr. Shivendra Pratap Singh and Dr. Ali Imam. This scale consisted of 18 items and suitable for the students of ninth grade (Vats, 2019). The school climate scale developed by School Climate Scale developed by Dr. Sajad Ahmad Mir was used for the research. It included 48 items (Bhat and Mir, 2018). The validity and reliability of these scales are given in the table1.

But the scale selected for adaptation is Delaware School Climate Scale-Students (Bear et al., 2011) which is a comprehensive scale. Twenty-three questions on a four-point scale from strongly disagree to strongly agree (1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree) make up the School Climate Scale. This scale was modified. The scale is further split down into five subscales; teacher-student relationship, student-student relationship,

fairness of rules, school safety and liking of school. Various parameters of CFA were summarised in the table 2.

Parameters	χ^2	CFI	RMSEA	SRMR
Values	1179.08; p < .00 1	0.965	0.028	0.028

Table2: the values of various parameters for Delaware SCS
The various items of the scale and the names of the sub-scales are given in the table 3.

Sr. No	**Teacher-student relationship**
1	Teachers care about their students.
2	Adults who work in this school care about the students.
3	Teachers treat students with respect.
4	I like my teachers.
5	Teachers listen to you when have a problem.
6	Adults in this school treat students fairly.
7	Teachers let you know when you are doing a good job.
8	Teachers are fair when correcting misbehaviour.
	Student-student relationship
9	Students really care about each other.
10	Students get along with one another.
11	Students treat each other with respect.
12	Students are friendly towards most other students.
	Fairness of rules
13	School rules are fair.
14	The rules are too harsh.
15	The school's code of conduct is fair.
16	Consequences of breaking the rules are fair.
	School safety
17	Students feel safe in this school.
18	This school is safe.
19	I feel safe in this school.
	Liking of school
20	I wish I went to another school.
21	I like this school.
22	I am proud of my school.
23	This school feels like a prison.

Table 3; Items and subscales of Delaware School Climate Scale

4. Methodology

The researcher used the descriptive research approach to perform this study. The investigator attempted to explain the student's perception of the school climate using descriptive study. This is an effort to examine and evaluate how pupils perceive all areas of the school climate.

a. Participants

The participants of this research were the students of senior secondary level (N = 300). The sample was consisted of students from all streams that is science (medical and non-medical), commerce and arts. The current research was used to collect the answers of the scale from senior secondary school pupils. With the help of the teachers and a formal authorization from the principal of the school, the students were handed the scale during class and information acquired from 300 seniors in high school. The participants had given their responses on seven-point Likert Scale that is 1 (Strongly Disagree) to 4 (Strongly Agree).

b. Procedure

To collect the required data from the students of senior secondary level, a systematic approach was adopted. First of all, the principal of the school was contacted by email and approval for the survey was obtained. The pupils were informed of the visit's purpose. The subjects were clearly provided instructions on how to fill out the replies, and their help in gathering information on the social event was greatly appreciated. It took the participant around 20 to 30 minutes to complete the survey and at that time give it back to the investigator.

5. Results

a. Reliability analysis

The reliability analysis revealed that the value of reliability coefficient for the overall scale was found to be 0.875, which a good and acceptable value. Moreover, the value of reliability coefficient for all the subscales was also in the acceptable range. In table 4, value of reliability coefficient for all subscales is summarised. The value of reliability coefficient for teacher-student relationship, student-student relationship, fairness of rules, school safety and liking of school were found to be 0.890, 0.747, 0.761, 0.894 and 0.750 respectively.

RELIABILITY ANALYSIS	Overall scale	0.875
	Teacher- student relations	0.890
	Student-student relations	0.747
	Fairness of rules	0.761
	School safety	0.894
	Liking of school	0.750

Table 4; Value of Cronbach's Alpha for Delaware School Climate Scale

b. Factor analysis

Before applying the exploratory factor analysis, the value for KMO and Bartlett test of sphericity has been calculated. The value of KMO was 0.869 and of Bartlett test of sphericity was 2965.683, which is significant at 0.05 level of confidence (table 5). Thus, we can run the confirmatory factor analysis.

KMO and Bartlett's Test

"Kaiser-Meyer-Olkin Measure of Sampling Adequacy".		0.869
"Bartlett's Test of Sphericity"	Approx. Chi-Square	2965.683
	Df	253
	Sig.	.000

Table 5; Values of "KMO" and "Bartlett's Test of Sphericity" for Delaware School Climate Scale

From the table 5, it is evident that the value of KMO is 0.869 and the value for Bartlett,s test of sphericity is 2965.683. These values are fine and acceptable. The total variance explained by the factors were found to be 19.661 %, 30.674%, 41.249%, 51.719% and 62.140 % respectively (table 6), which were fine and acceptable.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.876	29.894	29.894	6.876	29.894	29.894	4.522	19.661	19.661
2	2.394	10.409	40.303	2.394	10.409	40.303	2.533	11.013	30.674
3	2.065	8.980	49.283	2.065	8.980	49.283	2.432	10.574	41.249
4	1.705	7.413	56.696	1.705	7.413	56.696	2.408	10.470	51.719
5	1.252	5.444	62.140	1.252	5.444	62.140	2.397	10.421	62.140
6	.884	3.842	65.982						
7	.759	3.302	69.284						
8	.710	3.085	72.369						
9	.671	2.916	75.285						
10	.644	2.799	78.084						
11	.568	2.467	80.552						
12	.535	2.326	82.878						
13	.506	2.199	85.077						
14	.492	2.139	87.216						
15	.470	2.043	89.258						
16	.396	1.723	90.982						
17	.386	1.677	92.658						
18	.367	1.594	94.252						
19	.344	1.494	95.746						
20	.318	1.385	97.131						
21	.270	1.174	98.305						
22	.211	.916	99.220						
23	.179	.780	100.000						
Extraction Method: Principal Component Analysis.									

Table 6; Percentage of variance and cumulative percentage for Delaware School Climate Scale

c. Confirmatory Factor analysis

We gathered information for CFA from 300 participants. Data screening was done prior to CFA, and responses with missing values were eliminated. CFA was conducted using AMOS and came after EFA. Although the chi-square value is frequently used to estimate model fit, it is suggested to look at other fit indices like GFI, CFI, TLI, and RMSEA to evaluate the model fitness because of its sensitivity to the sample size.

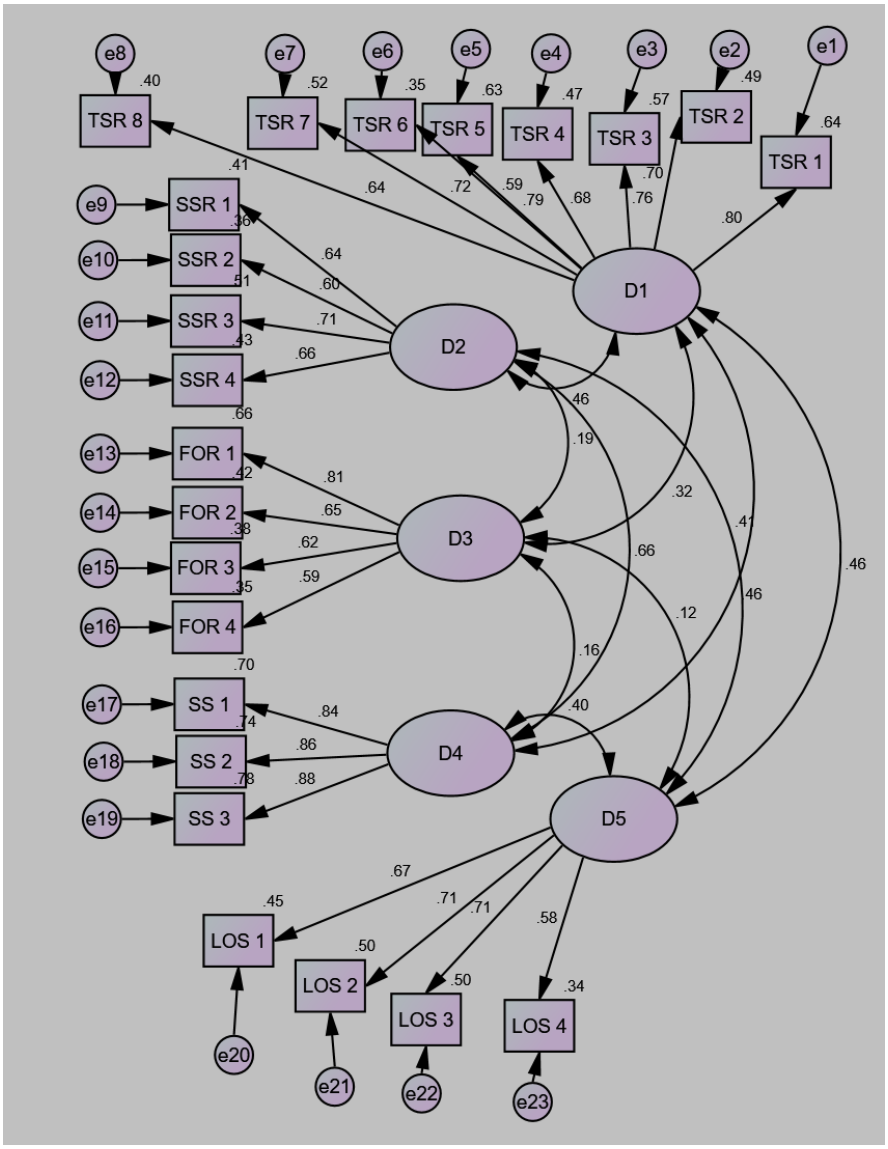

Figure1; CFA of Academic Buoyancy Scale showing factor loadings of each item

The fitness estimates of the model are as follows.

Measure	**P value**	**CMIN/DF**	**RMR**	**RMSEA**	**GFI**	**IFI**	**TLI**	**CFI**
Threshold value	*>0.05*	*<3*	*<0.08*	*<0.08*	*>0.90*	*>0.90*	*>0.90*	*>0.93*
Result	0.61	1.836	0.05	0.023	0.946	0.935	0.924	0.934

Table 7; fitness estimates for Delaware School Climate Scale

From the table 7, it is clear that all the measures for the fitness of the model are good and in the acceptable range. The value for CMIN/DF is 1.836 (p = 0.61). The value of RMR, RMSEA, GFI, IFI, TLI and CFI is .05, .023, .946, .935, .924 & .934 correspondingly. From these results it evident that this model is good and acceptable.

6. Discussion

The aim of this research was to adapt the Delaware School Climate scale in Indian context. There is number of scales of assessing school climate in India. But Delaware School Climate Scale is the most comprehensive scale and accepted by many researchers from different countries. So, it is the need of hour to validate this comprehensive scale in Indian context. The results of the research were very much acceptable. Reliability analysis, factor analysis and confirmatory analysis gave the awesome results. The value of Cronbach alpha for overall reliability of the scale and the subscales was found to be acceptable. In the factor analysis, the value for KMO is significant at 0.05 level of confidence. In CFA, the values of all the parameters were found to be in acceptable range. The current study suggests that Delaware School Climate Scale is suitable for study the perception of the students of senior secondary level about the school climate. This scale can be used to assess the climate of the schools in a comprehensive way and school administrators and policy makers can make the climate of the school favourable for the students. consequently, this will improve the academic performance of the students.

7. Conclusion

This scale was well adapted in the Indian context as all the estimates were found to be good acceptable. By utilizing this scale, we can concentrate on the varieties and different patterns in school climate in the Indian settings and can help the policymakers and school administrators to take care of the issues of the students. This instrument needs to experience the further examinations in various societies and diverse age bunches in India in various populaces and distinctive academic situations. Here is an extraordinary necessity of such apparatus for students since school environment impacts the scholastic execution of the pupils. As we realize that the eleventh and twelfth is utmost substantial phase meant for scholars as far as profession. In this manner, to improve the instructive execution of the students the environment of the institute ought to remain good. Thus, we should have such instrument for senior secondary level pupils, with the goal that the atmosphere of the institute can be surveyed and essential steps can be taken.

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