



(RESEARCH ARTICLE)



## High school education management: Significance of teacher care in student learning

Syed Haseeb Haider Shah <sup>1</sup>, Shahid Hussain Atta <sup>2,\*</sup>, Habiba Kalsoom <sup>3</sup>, Muhammad Ahmad Muneeb <sup>4</sup>, Shah Zaib <sup>5</sup>, Muhammad Awaz <sup>6</sup> and Gohar Afroz <sup>7</sup>

<sup>1</sup> Department of English language and literature, Riphah International University Faisalabad, Pakistan.

<sup>2</sup> Department of Social Science, The National College of Business Administration and Economics, Pakistan.

<sup>3</sup> Department of Zoology, The Government Sadiq College Women University, Pakistan.

<sup>4</sup> Institute of Food Sciences and Technology, Khawaja Fareed University of Engineering and Information Technology, Pakistan.

<sup>5</sup> Department of Civil Engineering, Institute of Southern Punjab, Multan, Pakistan.

<sup>6</sup> School of Engineering, Bohai University, Jinzhou, China.

<sup>7</sup> Faculty of Allied Health Sciences, University of Lahore, Punjab, Pakistan.

International Journal of Science and Research Archive, 2023, 10(02), 780–787

Publication history: Received on 01 November 2023; revised on 10 December 2023; accepted on 13 December 2023

Article DOI: <https://doi.org/10.30574/ijrsra.2023.10.2.1028>

### Abstract

In order to find out how different high school students' perceptions of teachers' caring behaviors affect their ability to learn and how well they do in school. A total of 259 individuals in their sophomore year of high school were chosen for the study using a convenience sample technique. Our survey data was analyzed statistically using the following instruments: teacher care behavior questionnaire, learning efficacy questionnaire, perceived stress and motivation questionnaire. There are three types of research subjects that can be classified based on how high school students perceive the pressure and motivation from teachers regarding care behavior: dynamic type, balanced type, and pressure type. The former group has high scores for both factors, while the latter has low scores for dynamic perception. There was a positive correlation ( $P < 0.05$ ) between the caring behavior of teachers in dynamic research subjects and learning efficacy, and a positive correlation ( $P < 0.05$ ) between the caring behavior of teachers in balanced research subjects and exam scores and learning efficacy. The correlation analysis revealed that the learning efficacy of balanced research subjects was positively correlated with two indicators: exam scores and class ranking, and with a positive correlation between the learning efficacy of dynamic research subjects and class ranking. The analysis of the mediating effect found that learning efficacy plays a complete mediating role in the prediction of teacher care behavior on exam scores.

**Keywords:** Learning efficacy; Teacher's caring behavior; Motivation; Academic performance; Pressure

### 1. Introduction

In the era of artificial intelligence and big data, the cultivation of student learning behavior and the motivation of student learning motivation are relatively complex. As smart information technology advances, countries have proposed their manufacturing and education industries development legislation [1-2]. China launched the "Made in China 2025" development strategy in 2015 [3]. Teacher support behavior not only creates a good classroom learning atmosphere, enhances students' learning confidence and efficiency [4], but also buffers students' stress and fatigue during the learning process [5-6], reduces the impact of negative factors (such as addiction to the Internet), and encourages students to actively participate in learning [7], resulting in better academic performance.

Teachers offer their students help on multiple levels and in various ways. Support for students, as seen by students, can take many forms, including emotional support, autonomy support, and cognitive support [8]. From the other side,

\* Corresponding author: Shahid Hussain Atta

teachers show their support for students through caring behavior, which includes treating students with respect and acceptance, providing encouragement and support, and carrying out their teaching duties. Teachers' caring conduct influences students' academic progress through achievement motivation, according to empirical study [9].

Learning efficacy is a subjective evaluation of a student's belief in their learning ability, that is, their ability to complete learning tasks and engage in specific learning activities. Learning efficiency is the core component of academic confidence and an important source of achievement motivation. Therefore, learning effectiveness has a significant impact on student academic performance. Ma et al. [10] believes that the learning efficiency of middle school students is a one-dimensional structure. Hamann et al. [11] further divides learning efficacy into learning ability efficacy and learning behavior efficacy: learning ability efficacy refers to an individual's judgment and confidence in whether they have the ability to successfully complete their studies, achieve good grades, and avoid academic failure; Learning behavioral efficacy refers to an individual's judgment and confidence in whether they can adopt certain learning methods to achieve learning goals. Learning efficacy can affect students' cognitive energy investment and the use of learning strategies during the learning process, thereby affecting their academic achievement [12]. Liu et al. [13] shows that the relationship between learning ability efficacy and academic performance is closer. Both student learning ability efficacy and learning behavior efficacy play a partial mediating role between teacher care behavior and student academic performance. However, the mediating role of student learning ability efficacy is greater than that of learning behavior efficacy.

From the definitions of teacher care behavior and learning efficacy, as well as existing empirical research, it can be seen that both have significant implications for promoting student academic performance. However, the research on the promotion of student learning through teacher care behavior through learning efficacy is based on an untested assumption that teacher support and care behavior is always positive for students, but the actual situation may not be so. Teacher support and care for students are external, and their nature of action is positive or negative. They are also constrained by teacher-student interaction and influenced by students' understanding of the meaning of teacher behavior. In daily teaching or student learning, it is not difficult to find that each student observes different teacher behaviors, and the interaction between students and teachers also varies from person to person. Such factors inevitably lead to cognitive differentiation among students towards teacher behaviors. In terms of the attention and care of teachers, some students may view it as a supportive factor, generating motivation, enhancing learning motivation and confidence; Some students also view it as a limiting factor, fearing that the teacher's efforts will be let down, and view it as pressure, creating a defensive attitude. Even for the same student, their perception of teacher care behavior and the resulting pressure or motivation may vary at different stages of learning, in different contexts, or when facing different teachers.

When examining variations in how students perceive teacher support or care, it is evident that the influence of teacher caring behavior on student learning effectiveness and results can manifest through various channels. As research on teacher care behavior has not taken into account subjective characteristics of pupils, this theory cannot be proven at now. The main attentions of this study are;

- Exploring the connection between teacher care behavior and student learning efficiency, particularly in regard to student cognition, might provide valuable insights for customizing teaching methods to meet individual requirements and enhance teaching effectiveness.
- This study posits the hypothesis that the influence of teacher care behavior on student learning effectiveness is contingent upon the varying views of teacher care behavior among students.
- The study employs a questionnaire survey method to examine the precise influence of students' impression of teacher care behavior on their learning effectiveness and academic achievement.

### *Object*

Using convenience sampling method, 260 sophomore students from a certain high school were selected as the research subjects for a questionnaire survey. A total of 260 questionnaires were distributed, and 259 valid questionnaires were collected. Among them, there are 104 males and 141 females, and another 14 individuals have not reported their gender; The average age of the study subjects is  $(16.6 \pm 2.61)$  years old.

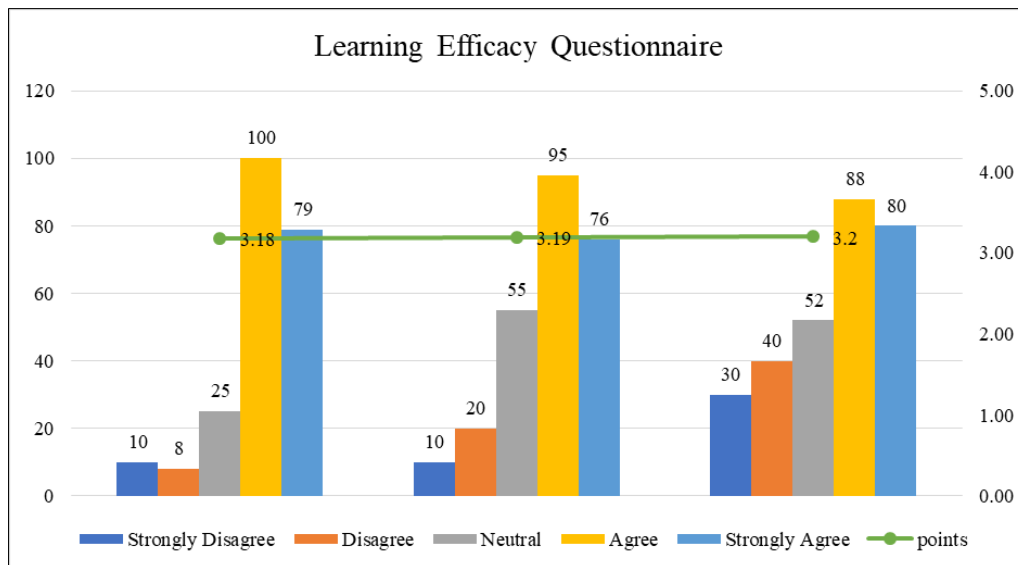
## 2. Methods

### 2.1. Behavior questionnaire

The student evaluation version of the teacher care behavior questionnaire is used to evaluate the level of care that teachers have for their students. This questionnaire includes three dimensions: conscientiousness, support, and inclusivity, with a total of 18 items. A 5-point scoring system is used, with scores ranging from 1 to 5, from "strongly disagree" to "strongly agree". The score of each dimension is the average score of the items included in that dimension, and the questionnaire score is the average score of each dimension. The Cronbach's of the entire questionnaire in this study  $\alpha$  Cronbach's with a coefficient of 0.94 for the dimensions of responsibility, support, and inclusivity  $\alpha$  the coefficients are 0.88, 0.83, and 0.85, respectively.

### 2.2. Learning efficacy questionnaire

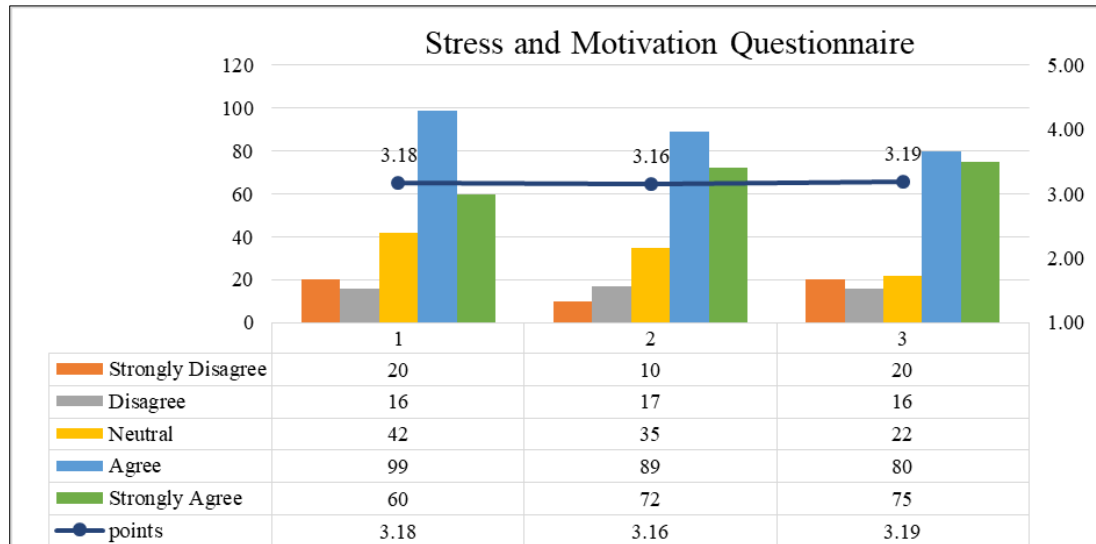
The learning efficacy questionnaire developed by [14] was used to evaluate the learning efficacy of the research subjects. The questionnaire includes two dimensions: learning ability efficacy and learning behavior efficacy, with a total of 22 items. A 5-point scoring system was used, with scores ranging from 1 to 5, from "very unpleasant" to "very agree". The score of each dimension is the average score of the items included in that dimension, and the questionnaire score is the average score of each dimension. Cronbach's of the entire questionnaire in this study  $\alpha$  with a coefficient of 0.91 for the dimensions of learning ability efficacy and learning behavior efficacy  $\alpha$  the coefficients are 0.92 and 0.78, respectively (Figure 1).



**Figure 1** Response on Learning Efficacy Questionnaire

### 2.3. Stress and motivation questionnaire

Using a self-designed questionnaire on perceived stress and motivation to understand how students understand the care of teachers. The driving force perception factor includes two items: "the teacher's care is the driving force for me to move forward" and "the teacher's dedication and support make me full of fighting spirit". The stress perception factor includes two items: "Sometimes I really hope the teacher doesn't treat me so well" and "the teacher's expectations and support are a burden for me". The questionnaire adopts a 5-point scoring system, with scores ranging from 1 to 5, from "strongly disagree" to "strongly agree". The score of each factor is the average score of the items included in that factor, and the questionnaire score is the average score of each factor. In this study, there was a significant positive correlation between the two components of the factors, indicating that the questions were homogeneous (Figure 2).



**Figure 2** Response on Stress and Motivation Questionnaire

#### 2.4. Academic performance

Academic performance includes two indicators, one of which is the self-reported final exam score. All students come from the same grade, and the final exam uses the same test paper, so there is no need for data standardization. The second is self-reported class ranking, divided into 5 levels, each level containing 20% of student rankings, with 1-5 points counted from the top 20% to the bottom 20%. The researcher served as the lead investigator, emphasizing anonymity before the test to ensure its effectiveness. The entire test was completed within 15 minutes.

#### 2.5. Common method test

Due to the use of self-report methods, there may be common methodological biases in the study. This study first used high reliability and validity measurement tools and anonymous methods for program control. After data collection was completed, the common method bias was tested [15]. The factor analysis results showed that there was a total of 8 factors with eigenvalues greater than 1, and the first factor explained a variation of 27.9%, which is less than the critical standard of 40.0%, indicating that no significant common method bias effect was found.

Statistical processing: The data entry, management, and analysis were all carried out using SPSS 22.0 software, with statistical methods including descriptive statistical analysis, correlation analysis, etc.  $P < 0.05$  indicating statistically significant differences.

### 3. Case Study and Results

*Correlation analysis between caring behavior, perceived stress and motivation, learning efficacy, and academic performance of research subjects' teachers*

The scores of the teacher care behavior questionnaire and its dimensions of responsibility, support, and inclusiveness for the research subjects were  $(4.48 \pm 0.55)$  points,  $(4.50 \pm 0.59)$  points,  $(4.54 \pm 0.54)$  points, and  $(4.43 \pm 0.68)$  points, respectively. The perceived pressure and motivation questionnaire, as well as the scores of motivations and pressure perception, were  $(3.76 \pm 1.21)$  points,  $(4.35 \pm 0.80)$  points, and  $(3.58 \pm 0.95)$  points, respectively. The scores for the dimensions of learning efficacy questionnaire, learning ability efficacy, and learning behavior efficacy were  $(3.66 \pm 0.60)$  points,  $(3.78 \pm 0.73)$  points, and  $(3.53 \pm 0.59)$  points, respectively; Their average exam score is  $(441.21 \pm 192.75)$  points, and their class ranking score is  $(3.53 \pm 1.45)$  points (Table 1).

**Table 1** Correlation analysis between caring behavior, perceived stress and motivation, learning efficacy, and academic performance of research subject teachers (r)

Variable	Care behavior	Due	Support	Inclusive	Motivate	Perception	Pressure	Sense of learning	Learning ability	Learning behavior	Exam scores	Class ranking
Teacher care behavior	1											
Due	0.92 a	1										
Support	0.91 a	0.77a	1									
Inclusive	0.94 a	0.75a	0.81 a	1								
Motivate	0.28 a	0.53a	0.27 a	0.31 a	1							
Perception	0.60 a	0.22a	0.56 a	0.56 a	0.62 a	1						
Pressure	0.16 a	0.33a	0.13 a	0.09 a	-0.75 a	0.05	1					
Sense of learning	0.33 a	0.27a	0.31 a	0.28 a	0.07	0.33 a	0.17 a	1				
Learning ability	0.24 a	0.31a	0.21 a	0.21 a	0.07	0.27 a	0.13 a	0.92 a	1			
Learning behavior	0.34 a	0.28a	0.31 a	0.31 a	0.04	0.31 a	0.22 a	0.89 a	0.66 a	1		
Exam scores	0.13 a	0.08	0.12 a	0.17 a	0.06	0.10	-0.01	0.20 a	0.16 a	0.17 a	1	
Class ranking	0.13 a	0.07	0.14 a	0.15 a	0.07	0.05	-0.05	0.18 a	0.16 a	0.19 a	0.19 a	1

a: P&lt;0. 05.

### 3.1. Perceived stress and motivation: learning efficacy and academic performance of different research subjects

Explore the differences in the effects of perceived stress and motivation on learning efficacy and academic performance among research subjects. Firstly, cluster analysis was conducted using the perceived stress and motivation questionnaire as indicators to distinguish research subjects with different levels of perceived stress and motivation. The results showed that according to the perceived pressure and motivation of high school students towards teacher care behavior, the research subjects can be divided into three basic types: the first type is the motivation type, which is characterized by high scores in the motivation perception factor (the median of this study is 3), and low scores in the pressure perception factor. There are a total of 85 research subjects in this type, accounting for 32.8%; The second type is the balanced type, characterized by high scores in both the dynamic perception factor and the pressure perception factor. A total of 129 subjects, accounting for 49.8%, were studied in this type of study; The third type is stress-induced, characterized by low scores in the motor perception factor and high scores in the pressure perception factor. There was a total of 45 participants in this type of study, accounting for 17.4%.

Secondly, analyze the relationship between teacher care behavior, learning efficacy, and academic performance among the three types of research subjects. Correlation analysis found that in terms of class ranking, the class ranking of motivational research subjects was positively correlated with their exam scores ( $r=0.27$ ,  $P<0.05$ ); In terms of learning efficacy, the learning efficacy of balanced research subjects is positively correlated with two indicators: exam scores and class ranking ( $r=0.18$ ,  $0.33$ ; both  $P<0.05$ ) (Table 2).

**Table 2** Correlation analysis between teacher care behavior, learning efficacy, and academic performance among different research subjects on perceived stress and motivation ( $r$ )

Variables	Perceived stress and types of motivation	Exam Scores	Class ranking	Sense of learning efficacy
Class Ranking	Power type	0.27 <sup>a</sup>		
	Balance type	0.15		
	Pressure type	0.12		
Sense of learning efficacy	Power type	0.19	0.06	
	Balance type	0.18 <sup>a</sup>	0.33 <sup>a</sup>	
	Pressure type	0.10	0.11	
Teacher care behavior	Power type	0.11	0.12	0.28 <sup>a</sup>
	Balance type	0.17 <sup>a</sup>	0.09	0.31 <sup>a</sup>
	Pressure type	0.19	0.16	0.08

a:  $P<0.05$ .

## 4. Discussion

### 4.1. Correlation analysis between caring behavior

The correlation analysis results show that teacher care behavior is positively correlated with motivation perception, with a general degree of closeness ( $r=0.60$ ,  $P<0.05$ ), while teacher care behavior is positively correlated with stress perception, with a lower degree of closeness ( $r=0.15$ ,  $P<0.05$ ). Both the sense of motivation and pressure were positively correlated with learning efficacy ( $r=0.32$ ,  $0.18$ ; both  $P<0.05$ ), but there was no significant correlation with exam scores and class ranking ( $P>0.05$ ). In addition, learning efficacy is positively correlated with exam scores and class ranking ( $r=0.19$ ,  $0.20$ ; all  $P<0.05$ ) (Table 1).

### 4.2. Perceived stress and motivation

In terms of teacher care behavior, the teacher care behavior of dynamic research subjects is positively correlated with learning efficacy ( $r=0.28$ ,  $P<0.05$ ), while the teacher care behavior of balanced research subjects is positively correlated with their exam scores and learning efficacy ( $r=0.17$ ,  $0.31$ ; all  $P<0.05$ ). Overall, there was no significant correlation ( $P>0.05$ ) between the caring behavior of teachers in stressful research subjects and their learning efficacy, exam scores,

and class ranking (Table 2). Further examination of the inter group differences in exam scores and class rankings revealed that there was no statistically significant difference ( $P>0.05$ ) among the three types of research subjects in these two indicators.

Finally, using a mediation analysis strategy similar to [16], the relationship between teacher care behavior, learning efficacy, and exam scores was analyzed. The results showed that learning efficacy played a completely mediating role in the prediction of teacher care behavior on exam scores. According to the clustering analysis, the research objects were grouped and analyzed. The above research results are consistent with the findings of [17]. The results showed that there were significant differences in the impact of teacher care behavior and learning efficacy on exam scores among different types of research objects ( $P<0.05$ ). For dynamic research subjects, teacher caring behavior can predict their learning efficacy, but cannot further predict their exam scores; For balanced research subjects, teacher caring behavior can affect their exam scores through learning efficacy; For stress-induced research subjects, there was no significant correlation between the variables ( $P>0.05$ ).

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## 5. Conclusion

This study found that teacher care behavior is positively correlated with high school students' sense of motivation, as well as their sense of pressure, but the degree of closeness is relatively low, indicating that overall, high school students transform teacher care into motivation. In addition, both motivation and pressure are positively correlated with learning efficacy, but they are not significantly correlated with exam scores and class rankings. Learning efficacy is positively correlated with exam scores and class rankings, indicating that motivation and pressure may affect learning performance through factors such as learning efficacy. At the same time, learning efficacy plays a completely mediating role in the prediction of teacher care behavior on exam scores, that is, the higher the degree of teacher care felt by the research subjects, the stronger their learning efficacy, and the better their exam scores. The research results also indicate that the significance of teacher care behavior is not uniform for all high school students: some high school students will understand teacher care behavior as pressure, some high school students will understand it as motivation, and some high school students will feel both pressure and motivation under teacher care. This difference in understanding will have different effects on the physical and mental state of high school students. Based on the subjective feelings of high school students towards teacher care behavior, the research subjects were divided into three categories: motivational, balanced, and stressful. The study explored the impact of teacher care behavior on their learning efficacy and academic performance for different types of high school students. The results showed that the impact of teacher care behavior on high school students is not always positive, and its effect varies depending on the perceived pressure and motivation of high school students.

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## Compliance with ethical standards

### *Acknowledgments*

The author(s) wish to acknowledge Mr. Shahid Hussain Atta (Department of Social Science, The National College of Business Administration and Economics, Pakistan) for providing the facilities and funding needed for this research work.

### *Disclosure of conflict of interest*

No conflict of interest.

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