



Impact of Teacher's Self-Efficacy on Student's Motivation towards Science Learning

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ARTICLE DETAILS	ABSTRACT
<p>History <i>Revised format: May 2019</i> <i>Available Online: June 2019</i></p> <hr/> <p>Keywords <i>Teachers' Self-Efficacy,</i> <i>Performance Goal, Achievement</i> <i>Goal, Students' Motivation,</i> <i>Intermediate Colleges, Pakistan</i></p> <hr/> <p>JEL Classification: <i>I230, A22</i></p>	<p>The study aims to identify the role of teachers' self-efficacy towards motivating students' learning process in intermediate colleges of Karachi, Pakistan. Using a causal research design, purposive sampling as a sampling technique and questionnaire as a data collection method, data were gathered from selected intermediates colleges of Karachi. The data from 312 sample cases were then analyzed by employing PLS-SEM through SmartPLS3 and results were identified. The results of the current study showed that teachers' self-efficacy has significantly positive effect on goal achievement active learning and learning environment. In addition, teachers' self-efficacy was found to have significant positive impact on performance goal and science learning value. By the initiation of proper training and working over the embracement of self-efficacy, the motivation of the students towards the learning of science, can be improved. The professional courses and teacher education programs to develop the sense of self-efficacy are also proposed by the professionals.</p>

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1. Introduction

Teachers play a significant role in the way student's perceive and motivate them but teachers' low self-efficacy have a negative impact on perceived abilities to perform that can be a challenge for students (Greco, Bernadowski, & Parker, 2018; Kilday et al., 2016; Mazlum, Cheraghi, & Dasta, 2015). This will lead students to believe that perhaps studies are not their personal strength (Laninga-Wijnen, Ryan, Harakeh, Shin, & Vollebergh, 2018; Taştan et al., 2018); thus decreasing his/her possibilities of performing well if not capable of doing such a task (Hamid, Shahrill, Matzin, Mahalle, & Mundia, 2013; Miller, Ramirez, & Murdock, 2017).

When engagement and interactivity decline due to lack of teachers' self-efficacy, there is high possibility that students may face (1) less-interactive and productive in the classroom; (2) they may not persist in their studies and coursework due to higher difficulty and uncertain teachers' behavior and (3) they find themselves unable to accomplish tasks and coursework (Shum, Lau, & Fryer, 2018; Thompson, 2016; Zee & Koomen, 2016). As noted by (Greco et al., 2018), high achievement is consistent with teachers' self-efficacy and importantly direct to inclining morale, efficacy and motivation in students (Kilday et al., 2016).

Lack of self-efficacy in teachers can increase complicated and difficult learning experience for students and it adversely affect students' motivation and academic achievement in Pakistan (Aslam & Ali, 2017). Teachers' feeling of hesitation to express and lack of confidence were few critical problems that are currently faced by teachers in Pakistan (Gulistan, Hussain, & Mushtaq, 2017). Moreover, Pakistan is currently facing shortage of quality teachers with strong self-efficacy beliefs. Poor education system due to typical teaching strategies and pedagogies, and weak self-efficacy beliefs of teachers, students were lagging far behind national and international requirements (Shahzad & Naureen, 2017).

Although a substantial research has revealed that teacher's self-efficacy can influence teachers and students; but unfortunately, such studies have failed to investigate more explicit link between teacher self-efficacy and students' motivation and achievement (Bolton, 2018; Greco et al., 2018; Hallinger, Hosseingholizadeh, Hashemi, & Kouhsari, 2018; Hardré & Hennessey, 2013; Ma & Cavanagh, 2018; Sahin-Taskin, 2017). However, these literatures have particularly used self-efficacy theory (Hallinger et al., 2018; Miller et al., 2017; Yamamoto & Yamaguchi, 2016; Zee & Koomen, 2016) and achievement goal theory (Laninga-Wijnen et al., 2018; Miller et al., 2017; Pamuk, Sungur, & Oztekin, 2017; Taştan et al., 2018) for providing considerable solution to these problems.

In this regard, a humanistic organismic perspective is used to examine motivated from the self-determination theory (Deci & Ryan, 2002a, 2011; Deci & Vansteenkiste, 2004). There are different forms of motivation that are integrated on a platform of self-determination according to self-determination theory. Moreover, the self-endorsement and greater choice of the behavior also explains different forms of motivation accordingly. The absence of self-determination is represented through motivation. Individuals disengage themselves from the activity and ultimately halt doing activities when motivated (Deci & Ryan, 2002b, 2008). Similarly, external pressures and incentives regulate extrinsic motivation. Individuals perform a behavior in order to acquire a reward or ignore a negative consequence when extrinsically motivated. The behavior is regulated through guilt, ego-evolvement, and introjections when the external pressures internalized the regulating behaviors (Deci & Ryan, 2002b, 2008; Gagné & Deci, 2005; Ryan & Deci, 2014; Ryan & Deci, 2000). Moreover, self-determined motivation is revealed from the identification. The behavior is important and vital to the individual when it is identified. Likewise, integration is another form of self-determined motivation, which appears when the behavior performed is integrated with other elements of the self-individual (Deci & Ryan, 2002a). Consequently, intrinsic motivation is revealed from the higher prototyping of self-determination. Individuals are engaged in the activities performed for the satisfaction and pleasure driven while performing the activity when intrinsically motivated. Therefore, using self-determination theory, the study has intended to examine the impact of teacher self-efficacy on the students' motivation and achievement.

2. Literature Review

2.1 Self-Determination Theory

A humanistic organismic perspective is used to examine motivated from the self-determination theory (Deci & Ryan, 2002a, 2011; Deci & Vansteenkiste, 2004). There are different forms of motivation that are integrated on a platform of self-determination according to self-determination theory. Moreover, the self-endorsement and greater choice of the behavior also explains different forms of motivation accordingly. The absence of self-determination is represented through motivation. Individuals disengage themselves from the activity and ultimately halt doing activities when motivated (Deci & Ryan, 2002b, 2008). Similarly, external pressures and incentives regulate extrinsic motivation. Individuals perform a behavior in order to acquire a reward or ignore a negative consequence when extrinsically motivated. The behavior is regulated through guilt, ego-evolvement, and introjections when the external pressures internalized the regulating behaviors (Deci & Ryan, 2002b, 2008; Gagné & Deci, 2005; Ryan & Deci, 2014; Ryan & Deci, 2000). Moreover, self-determined motivation is revealed from the identification. The behavior is important and vital to the individual when it is identified. Likewise, integration is another form of self-determined motivation, which appears when the behavior performed is integrated with other elements of the self-individual (Deci & Ryan, 2002a). Consequently, intrinsic motivation is revealed from the higher prototyping of self-determination. Individuals are engaged in the activities performed for the satisfaction and pleasure driven while performing the activity when intrinsically motivated.

Different forms of motivation are distinctly associated with the performance, well-being, behavioral, psychological, physical, and creativity as demonstrated through the research on self-determination theory (Sahin-Taskin, 2017). The association between long-lasting maintenance of weight loss, higher quality learning, higher levels of well-being, and prolonged abstinence from smoking behaviors and self-determined forms of motivation is

positively emerged. Increased anxiety in school children and negative health and well-being consequences are positively related with non-self-determined forms of motivation (Deci & Ryan, 2016).

Evidence of automatic procedures associated to motivation is integrated in the humanistic theory of motivation, which includes self-determination theory (Han & Yin, 2016; Rodríguez et al., 2014). A rigorous impact on the level of motivation of an individual can be explained appropriately through autonomy and controlling supportive contexts (Taştan et al., 2018). The level of self-determination for the effects to expose the effects is affected from the controlling environments of individuals. The effects of autonomy supportive environments are associated with the level of self-determination. These effects can occur when individuals are not aware of the presence of non-conscious motivational procedures (Kuo, Tuan, & Chin, 2018; Schiefele & Schaffner, 2015).

2.2 Relationship between teachers' self-efficacy and active learning strategy

The research of De Jong et al. (2014), show that there is a strong relationship between the teachers' efficacy and the performance of the teachers. This means that if the teacher has high self-efficacy, he/she will more likely be able to teach students. The opposite will be the case if the teacher has low self-efficacy. In case of low self-efficacy, teachers' might not be well equipped with abilities when dealing with the heterogeneous classrooms or the classrooms which have students from diverse backgrounds. This shows that teachers' efficacy can also be affected by the heterogeneous classrooms as they might be less confident about their abilities when they see students with different backgrounds (Marsh, & Seaton, 2013). The relationships between teachers and students also influences classroom climate (Doğan & Adams, 2018); teachers are responsible for regulating the classroom environment, including regulating classroom discipline, implementation of approaches and methods to learning, interacting with the students in the classroom (Shum, Lau, & Fryer, 2018). Taştan et al. (2018) found that students' perceptions of positive affinity with their teachers were related to their pursuit of pro-social classroom goals such as getting along with others and being socially responsible, and were more strongly correlated to student interest in school than perceived support from parents and peers. One way that teachers convey these qualities is through their discourse with their students in the classroom (Edwards, 2017; Greco, Bernadowski, & Parker, 2018). Classroom discourse structure concerns the manner in which teachers engage student participation in learning, promote intrinsic motivation, and balance appropriate challenges with skill levels (Rowbotham, 2015; Whitworth & Chiu, 2015).

H1 Teachers' self-efficacy has significant impact on active learning strategy.

2.3 Relationship between teachers' self-efficacy and achievement goals

Schunk, Pintrich, and Meece (2008) found that students' perceptions of positive affinity with their teachers were related to their pursuit of pro-social classroom goals such as getting along with others and being socially responsible and were more strongly correlated to student interest in school than perceived support from parents and peers. Perceived support from teachers also is a positive predictor of effort in schools and the pursuit of social responsibility goals, including acting in pro-social ways that encourage peer cooperation. Conversely, students who perceive teachers as harsh and cold are found to consistently display poor social behavior and low social goals as well as to achieve lower academically, in comparison with their peers (Zee & Koomen, 2016).

Yerdelen and Sungur (2018) investigated the relationship between student achievement and teacher efficacy. The result of the study indicated that students' achievement was higher in classrooms of teachers who had more contact with their coaches, and in classrooms of teachers with greater confidence in the effectiveness of education. A number of studies have elaborated about the influence of teacher self-efficacy beliefs on children's achievement and success at school (Miller, Ramirez, & Murdock, 2017; Rodríguez et al., 2014; Taştan et al., 2018). Teacher's self-efficacy beliefs may influence a student's achievement in several ways: teachers with high self-efficacy beliefs are more likely than teachers with a low sense of self-efficacy to implement didactic innovations in the classroom, to use classroom management approaches (Kilday, Lenser, & Miller, 2016) and adequate teaching methods and encourage students' autonomy, and to take responsibility for students with special learning needs (Laninga-Wijnen, Ryan, Harakeh, Shin, & Vollebergh, 2018), to manage classroom problems (Chacon, 2005), and to keep students on task (Deci & Ryan, 2016).

H2 Teachers' self-efficacy has significant impact on achievement goals.

2.4 Relationship between teachers' self-efficacy and science learning value

Some of the authors also believe that there are several different factors that contribute toward the self-efficacy, these factors include own past performance of an individual, verbal feedback as well as persuasion, the observation of the performance of the other individual, appropriate or realistic setting of the goal as well as factor of

constructive and positive feedback (Hamid, Shahrill, Matzin, Mahalle, & Mundia, 2013). Previous research has established that science self-efficacy is associated with science achievement and science-related choices across grade levels (Ubuz & Aydinyer, 2017). In addition, past success in science could possibly contribute to higher self-efficacy which, in turn, could lead to better future performance (Holbrook, Rannikmae, & Valdmann, 2014). At the college level, research has indicated that science self-efficacy is a predictor of achievement, persistence in science-related majors, and career choices (Moyo & Mnguni, 2018; Taştan et al., 2018). At the high school level, research has indicated that self-efficacy is a stronger predictor of achievement and engagement in science-related activities than is gender, ethnicity, or parental background (Dunn & Lo, 2015; Kuo et al., 2018). Among middle school students, science self-efficacy predicts science achievement, with girls having higher science grades and stronger self-efficacy than do boys (Salzburg, 2015). The sense of self-efficacy of the teachers can positively influence the motivation as well as learning of the students even when the students are considered to be difficult or when the students are unmotivated. Most of the research studies have also indicated a positive relationship between self-efficacy of the teacher's beliefs as well as cognitive outcomes of the several students such as achievement in the special and core academic subjects of the teachers and also the skills and performances (Shahrill & Mundia, 2014).

H3 Teachers' self-efficacy has significant impact on science learning value.

2.5 Relationship between teachers' self-efficacy and performance goal

Performance goals, on the other hand, concern demonstrating own competence or ability to others and being the best in a group while doing a task (Ghanizadeh & Ghonsooly, 2014; Han & Yin, 2016). Accordingly, performance approach goals concern outperforming others and having favorable judgments about their competence, whereas performance avoidance goals focus on avoiding unfavorable judgments about competence and looking incompetent (Schiefele & Schaffner, 2015). In addition, Pamuk, Sungur, and Oztekin (2017) examined how the interaction between student and teacher characteristics affects teachers' predictions of students' academic and social success. Findings indicated that teachers with high efficacy made less negative predictions about students, and seemed to adjust their predictions when student characteristics changed, while low efficacy teachers seemed to be paying attention to a single characteristic when making their predictions (Skaalvik & Skaalvik, 2017; Taştan et al., 2018; Zee & Koomen, 2016). The researchers have also shown the buffering effect of the self-efficacy on the relationship between strain and stress whereas some of the researchers also demonstrated the relationship of the development of the self-beliefs of the teachers as well as emotional exhaustion, however the researcher had not demonstrated a direct effect of the change in the self-efficacy of the teachers on the change in the burnout and also did not examine the prediction of the variation in one variable through starting levels of the other variable (Ingersoll, 2012). The most important objective of the classroom management is to reduce the level of disturbance during the lesson so as to attain the teachings of high quality (Zee & Koomen, 2016). It is found that the teachers who possess the better skills of teaching maintain the class room management and also succeed in reducing the disturbance during the lessons by constantly observing the behavior of the students and also by telling the students that they know about their activities within the class.

H4 Teachers' self-efficacy has significant impact on performance goal.

2.6 Relationship between teachers' self-efficacy and learning environment

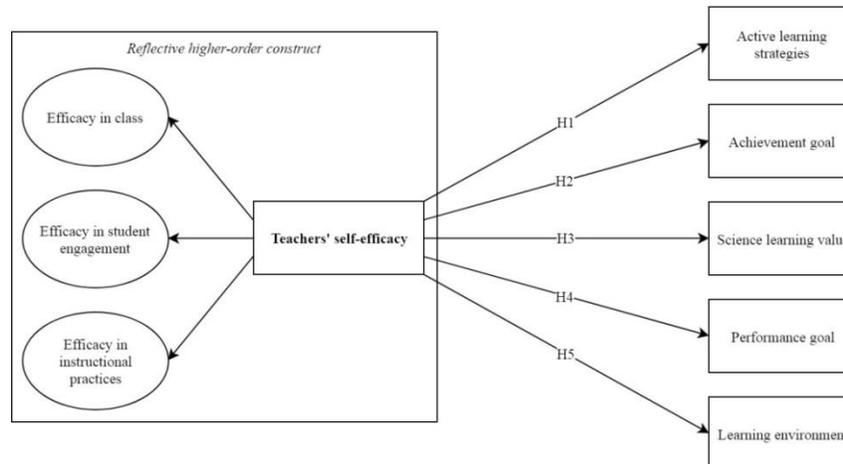
The study by Guo, Justice, Sawyer, and Tompkins (2011) also indicate that administrators are very important in the leadership of education and that the administrators that are making continuous efforts in order to increase the achievement level of the students contribute toward enhancing the student motivation. Students mostly attended the classes of those teachers in which they enjoy to learn something because the teachers make effort in order to engage the students in different tasks and these teachers also love their profession and thus contribute towards engaging and motivating the students to perform outstanding throughout their academic life (Wyatt, 2014). According to (Ghanizadeh & Ghonsooly, 2014; Han & Yin, 2016) motivation is a process for goal-directed activity that is instigated and sustained. Teachers who care were described as demonstrating democratic interaction styles, developing expectations for student behavior in light of individual differences, modeling a "caring" attitude toward their own work, and providing constructive feedback (Han & Yin, 2016).

Moreover, efficient teachers encourage students for understanding (Deci & Ryan, 2016; Doğan & Adams, 2018). They treat students' misunderstandings in the subject and they utilize different visual aids in order to make the subject more enticing and meaningful (Miller et al., 2017; Pamuk et al., 2017; Rodríguez et al., 2014; Taştan et al., 2018). Additionally, they give students opportunities to engage in conversations and give substantive feedback rather than scores on assignments (Yerdelen & Sungur, 2018). Additionally, there is some evidence that teachers' affect, like enthusiasm for learning and their sensitivity concerning students' treatment, might affect students'

emotions related to the objectives (Zee & Koomen, 2016). Such type of teacher also shows the characteristics of being persistent, more focused towards their academic activities, gives maximum time in the classroom, utilizes the difficult and innovative strategies for the teaching, gives support to the low grade teachers and provide motivation to the learners, and also give positive remarks to the student's achievements as compare to the teachers who have low expectations from their teachings and who consider that their teaching will not influence the learning of the students (Zumbrunn, Tadlock, & Roberts, 2011).

H5 Teachers' self-efficacy has significant impact on learning environment.

Figure 1: Conceptual framework



3. Design/Methodology/Approach

This research strategy primarily focuses on individuals, groups and institutions, involving different types of methods and materials and importantly, the core theme based on the analysis to describe, compare, contrast or classify the accessible and target population (Saunders, Lewis, & Thornhill, 2009). In the current study, the data collection process was taken place at intermediate government colleges of Karachi city. This research setting was taken into consideration to improve the response of the participants and provide institutional environment that can help to provide better and comprehensive viewpoint about teachers' self-efficacy at the college. Furthermore, this research setting was selected based on the rationale that teachers can be deliberate in sharing their opinion in the context of their profession.

The study has used online sample size calculator for estimating desirable number of sample representatives from the infinite population. The study has used anticipated effect size as 0.30 and statistical power as 0.95 and confidence interval was at 5 percent, as estimated by Soper (2018), an online sample size calculator for structural equation modeling. The estimation has provided minimum sample size of 256 responses from the accessible population. Thereby, the study has distributed total 500 sample responses, whereas 378 responses were return and after discarding useless 66 questionnaires, the study retained 312 questionnaires with the response rate of 82.6 percent. The study has purposefully focused on using survey methodology as primary data collection technique.

The study has competent option of employing Partial Least Square (PLS) Structural Equation Modeling (SEM) using SmartPLS software. Additionally, the rationale for using PLS-SEM as data analysis technique is that it belongs to second generation data analysis technique, capable of handling any number of sample data and also, it includes advance versions of discriminant validity and convergent validity estimations. Therefore, the study has purposefully employed PLS-SEM as data analysis technique.

4. Findings

For assessing the internal consistency of the variables in pilot study, the study has undertaken the threshold of 0.60 for Cronbach's alpha recommended by Nunally and Bernstein (1994). All the constructs in pilot study have achieved considerable internal consistency and hence, the instrument has been statistically validated for data analysis.

As per the suggestive parameters of (Hair, 2010; Tabachnick, Fidell, & Osterlind, 2001), factor loadings should be greater than 0.70 for adequate construct development while (Hair, Hult, Ringle, & Sarstedt, 2016) manifested that

item loadings between 0.40 and 0.60 should also be taken into consideration in case their relative constructs have adequate convergent validity. Here, in the present tabulation, all items were loaded with greater than 0.50 loading values, whereas their respective constructs have also achieved convergent validity at recommended thresholds. Hence, the construct validity has been manifested appropriately. There are total of 8 items to check their validity, including achievement goal, active learning strategies, efficacy in class, and efficacy in instructional practices, efficacy in student engagement, learning environment, performance goal, and science learning value.

Table 1: Convergent Validity

	Composite Reliability	Average Variance Extracted (AVE)
Achievement Goal	0.795	0.567
Active Learning Strategies	0.833	0.714
Efficacy in Class	0.765	0.528
Efficacy in Instructional Practices	0.834	0.502
Efficacy in Student Engagement	0.867	0.685
Learning Environment	0.774	0.537
Performance Goal	0.833	0.719
Science Learning Value	0.765	0.531

In the above tabulation, all the constructs have greater than 0.60 value of Cronbach’s alpha coefficient; thus, adequately met threshold for reliability analysis (Nunally & Bernstein, 1994). Moreover, all the constructs showed greater composite reliability than threshold of 0.80 as suggested by Fornell and Larcker (1981); Hair (2010); Hair, Sarstedt, Ringle, and Mena (2012); Tabachnick et al. (2001). Finally, AVE coefficients should have greater values than 0.50 for adequate variance among the items (Fornell & Larcker, 1981; Hair, 2010; Hair et al., 2012; Tabachnick et al., 2001).

Figure 2

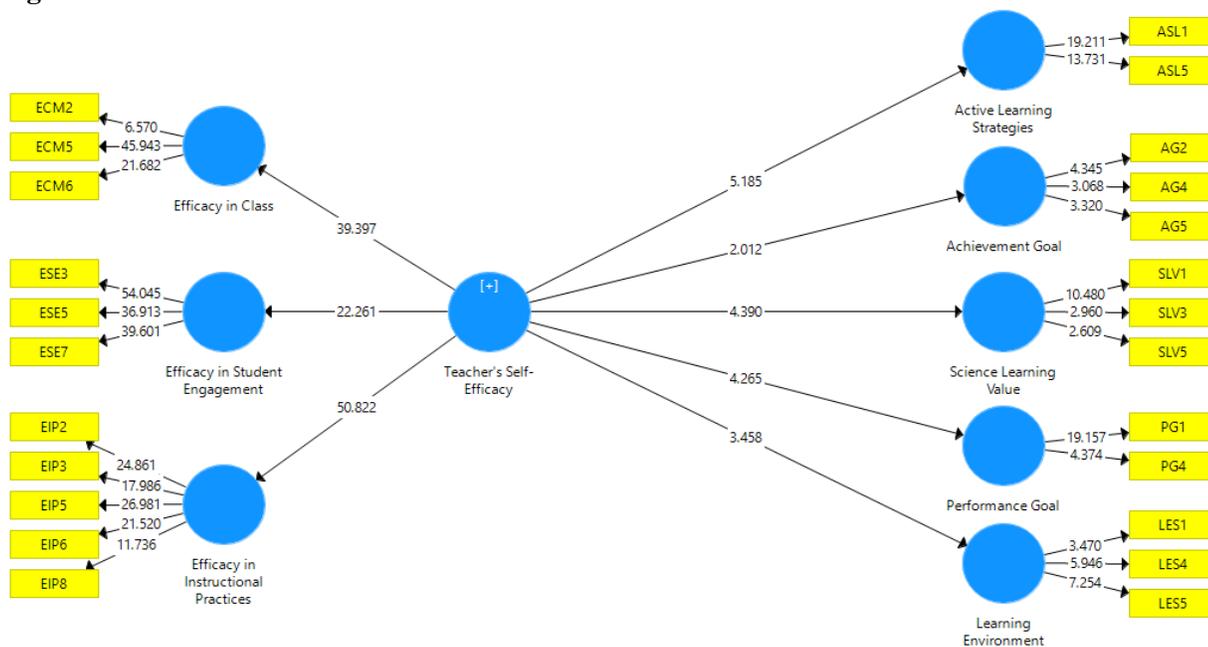
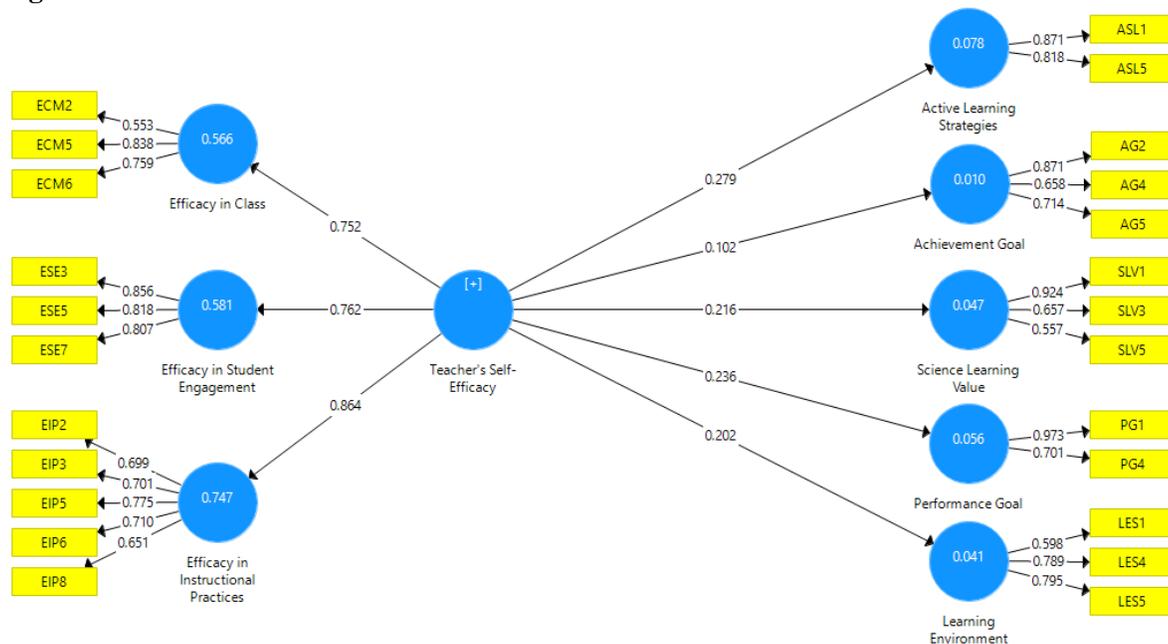


Table 2: Path Analysis using Structural Equation Modeling (SEM)

	Estimates	Std. Dev.	T Stats	P Values
Teacher's Self-Efficacy → Achievement Goal	0.102	0.051	2.012	0.044
Teacher's Self-Efficacy → Active Learning Strategies	0.279	0.054	5.185	0.000
Teacher's Self-Efficacy → Learning Environment	0.202	0.059	3.458	0.001
Teacher's Self-Efficacy → Performance Goal	0.236	0.055	4.265	0.000
Teacher's Self-Efficacy → Science Learning Value	0.216	0.049	4.390	0.000

Figure 3



5. Discussion

The study has shown a significant and positive effect of teacher's self-efficacy on achievement goal. This finding is supported with the findings of previous studies (Eren, 2009; Lavasani, Malahmadi, & Amani, 2010; Mojavezi & Tamiz, 2012). Lavasani et al. (2010) have found a positive and direct effect of teacher's self-efficacy on achievement goals of students of mathematics class. Mojavezi and Tamiz (2012) have also revealed a positive and significant impact of teacher self-efficacy on the motivation and achievement of students. Eren (2009) has presented that efficacy beliefs and achievement goals predict significantly the conceptions of teachers about learning and teaching. Taştan et al. (2018) have further reported significant effect of motivation and self-efficacy of teachers on academic achievement goals in science education. Bolton (2018) has found an insignificant impact of teachers' self-efficacy on students' achievement goal and motivation.

Mazlum, Cheraghi, and Dasta (2015) showed that there is a direct and positive impact of teachers' self-efficacy on the deep learning approaches of students. Virtanen, Niemi, and Nevgi (2017) have also revealed that self-regulated learning strategies of students are directly affected by professional competences of highly motivated teachers. Sahin-Taskin (2017) has asserted that active learning strategies are supportive in evaluating the professional development of pre-service teachers with respect to alternative assessment methods. Ma and Cavanagh (2018) have reported a moderately higher level of self-efficacy of pre-service teachers on teaching experience, personal qualities and attributes, teacher-student relationship, and previous informal teaching and other relevant experience. Tilfarlioglu and Ulusoy (2012) have revealed a significant and direct impact of teachers self-efficacy in EFL communications for classroom management and the perceptions of misbehavior of English language teachers and its causes. Hasan and Bozkaya (2016) have shown that there is a positive and direct effect of self-efficacy beliefs and goal orientations of teachers. Furthermore, different characteristics of motivation are portrayed through the mastery and performance oriented pre-service teachers. Similarly, Chea and Shumow (2017) have asserted a positive and direct effect of performance-avoidance goal orientations and writing mastery with respect to teachers' self-efficacy.

6. Conclusion

In this study, self-efficacy of teachers is in view, to evaluate the student's motivation through active learning strategies, science learning value, performance goal, and achievement goal and learning environment. The results of the study conclude that self-efficacy of teachers' acts as major influencer of the active learning strategies, science learning value, performance goal, achievement goal and learning environment. Moreover, teacher's self-efficacy is significantly impacting on the motivation of the students, related to the science learning, as all the independent variables; active learning strategies, science learning value, performance goal, achievement goal and learning environment are positively impacting by the teacher's self-efficacy. Managers and professionals need to focus over the development of self-efficacy within the teachers, as it motivates the students. By the initiation of proper training

and working over the embracement of self-efficacy, the motivation of the students towards the learning of science, can be improved.

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