A STRATEGIC LEADERSHIP TO IMPROVE HIGHER SECONDARY MATHEMATICS TEACHERS' TEACHING PRACTICES

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Abstract

The purpose of this study was to develop a leadership model to improve higher secondary mathematics teaching strategies. The model was developed to enhance leadership style and teaching strategies. This study was conducted by two objectives. The first objective was to determine the impact of leadership style on teachers' teaching strategies of higher secondary mathematics teachers. The second objective was to compare the teachers teaching strategies before and after they attend the leadership style training program. Quantitative method was used for the study. The major theories were situational leadership and transactional leadership and the teaching strategies questionnaires were taken from reviewed literature. A survey was used to collect the quantitative data from the secondary mathematics teachers. For the quantitative data, statistical analysis was carried out to obtain the Mean and Standard Deviation. Multiple regression analysis was utilized to find significant variables. A survey using the leadership styles questionnaire were distributed to a sample of one hundred fifty secondary mathematics teachers. The current leadership style and teaching strategies were found to be moderately practiced by the higher secondary mathematics teachers. A model of leadership style for higher secondary mathematics teachers' teaching strategy was two parts: leadership style and teaching strategy. The new leadership model will hopefully be utilized by the higher secondary mathematics teachers, school leaders and the administrators. The new leadership model aims at implementing in the higher secondary mathematics teachers' being investigated. It is believed that the model would substantially influence the way the higher secondary mathematic teachers' currently practiced leadership. The administrators can adjust themselves in performing their leadership practices through a number of factors which include time constraints and workloads, cooperation, culture, and values, qualification, skills, and experience, organizational structure, funding and facilities, and tasks and roles related to leadership.

Keywords: Leadership, Higher Secondary, Mathematics Teachers and Teaching Strategies.

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1. Introduction

As said by Swami Vivekananda "Education is the manifestation of the perfection already in man". The idea of teaching and the way the education was very different in India. Even though there was a regulating leadership but still there were few which runs differently (Nessipbayeva, 2012). Effective teacher leaders offer and keep on building up, a lot of miens and mentalities. They were enthusiastic daring individuals whose honesty, high adequacy, and substance learning give them believability with their partners (Zapata, 2006). Their craving to work with grown-ups was grounded in their conviction that frameworks level change would emphatically affect student learning. All together for teacher leaders to prosper, certain qualities and conditions. Teacher leaders must have the information and abilities expected to lead. Subsequently, to be viewed as a leader, they should also have a lot of positive thoughts and negative thoughts. At last, there must be an assortment of chances for the initiative in the school, area or larger context. Based on Indian Education System, Teaching Competencies were given more important for students learning. A student's academic achievement is based on teacher's teaching competencies (Venkataiah, 2002). In India, technology-based

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education system is still being under developed. Teachers are using the traditional method of teaching like chalk-board method to the students. Teachers are not well trained on the teaching competencies due to financial conditions and their interest. Teachers leadership style was very important in their teaching journey. The school leaders found the problem for leading the teachers' leadership skill. The teachers did not experience about the leadership quality so they found very difficult to follow the school leaders (Yo rk & Duke, 2004). But the secondary mathematics teachers' had quality of leadership skill but they did not use properly. All the teachers and the school leaders were not aware of the leadership style to use in the correct place.

2.Literature Review

The purpose of literature review is to review the literature and studies done related to leadership style and higher secondary mathematics teachers' teaching strategies

2.1. Leadership

Leadership styles helped the higher secondary mathematics teachers' teaching strategy. The higher secondary mathematics teachers did not practice their leadership styles in the classroom. So the researcher started to review all the leadership styles and theories for improving the teachers teaching strategy (Ahanagar, 2009).; Caspi, 2014). The leadership styles were autocratic, democratic, laissez-faire, charismatic, task-oriented, transactional, servant, strategic and situational. Those styles were widely used in leadership based literatures. There might be more styles but the above mentioned styles were quoted more effective than any other (Morsidi, Sian, & Abdullah, 2015). Autocratic leadership style was known for individual leadership overall sets and involvement from staff. Command and control were typical of this style. This leadership utilizes total, tyrant power over staff. Democratic leadership assumed job in democratic development, understanding the idea of popularity-based on administration was fundamental. The system incorporates settings, inspirations, attributes, allows creativity, and results of majority rule leadership. Laissez-Faire leadership style was given guidance and direction. It needed a good leader who could build up a vision, get it done information from the group towards the vision. Charismatic leadership style was to strengthern the leaders' quality in their organization. This ability to make enthusiasm and duty was an enormous preferred position. They prompt trust through identifiable management. They were strict leaders. The task-oriented style required coordination of work-related activities, offering essentialness to definitive activities, coordinating quality and showed up at various leveled targets. They were less stressed over the delegates and achieve the preferred targets. Control plays an important role in transactional leadership. It focusses on completion of the task for the efficient and quick achievement of the goal. The leadership style based on the product. The Situational leadership style changed the leader to active and get the best results. In this leadership approach an individual have the choice to alter their power style as demonstrated by the conditions to be a good leader (Blanchard, 2013).

2.2. Higher Secondary

Higher secondary means grade eleven and grade twelve. School education in follows a ten plus two systems: ten years of compulsory schooling in which all students follow the same stream, followed by two years in which one chooses a set of optional subjects. India, with its strong mathematical traditions, may be expected by the world to produce excellence in mathematics (Jankvist, 2009).

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2.3. Mathematics Teachers

Mathematics teachers mean those who have done their undergraduate in mathematics and bachelor in education. Also who has completed master in mathematics and bachelor in education. They are eligible to become a teacher. The chapter on Mathematical Logic include subtopics on mathematical statements and truth values, the use of Venn diagrams in logic, conjunction, disjunction, conditional statements, biconditional statements, truth tables and applications to switching circuits (Banach, 1956). Those topics were reintroduced in 2003 in a chapter called 'Boolean Algebra' which included Boolean algebra as an algebraic structure, principle of duality, concepts of conjunction, disjunction, conditional statements, biconditional statements followed by truth tables and applications to switching circuits.

2.4. Teaching Strategies

The researcher found teaching strategies in three steps, teaching strategy I and the characteristics were creating, utilizing lesson, cooperative learning, and nurturing math. Teaching Strategy II and the characteristics were attributes, core process and functions. Teaching strategy III and the characteristics were organizing, practice, changing, process and evaluating. The researcher identified the main idea and most important facts, then writing a brief overview that includes only those key ideas and details. The proposed research motivations, there were multiple links between the capabilities and structures of the three regions, the control, planning and management of educational projects, as well as the preparation of teachers and the improvement and utilization of teaching materials (Pollard, 2015). Worldwide surveys play a crucial, though not artificial, role in shaping scenarios for the structure, use, and achievement of educational programs. There were frameworks where essential mathematics teachers were experts and other where they were generalists. It had not with in the points of this investigation to enter profoundly about pro and generalist teachers in early teaching both model shows favorable circumstances and inconveniences (Kushwaha, 2014). It was important to highlight the teaching and learning process. If the teachers not proficient in higher secondary mathematics and particular teaching strategy it has affected the learners (Ormord, 2010). So the teacher had to develop the leadership style towards teaching strategy. Teacher holding constructionist perspective of mathematic were depended upon to embrace teacher student cooperation method of guidance by enabling student to investigate and examine while teachers dwell in their classrooms as facilitators (Sullivan, 2011). Critical thinking was key to teach for constructionist environment (Rogus, 1988; Pellicer & Anderson, 2001). Teacher where deliberate action originates from issue circumstances that require thinking and innovative considering, assembling and applying data, finding, imagining, imparting and testing thoughts. Therefore, the classroom went up against a constructivist situation.

3. Methodology

The researcher utilized quantitative method design as referenced Creswell (2013) for this study. Total sampling method was used in this study. The survey instrument to collect quantitative data with respect to research objectives one and two. The statistical analysis was multiple regression and "t" test computed. The researcher used multiple regression to analyze the data. Multiple regression is used when there are more than two variables, one dependent variable and the others are independent variables. According to McDonald (2014), multiple regression was used to find which independent variables have greater effect on the dependent variable. In this research objective, the

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researcher wanted to find out among the eight factors, which ones had greater effects on teaching strategy. The eight factors were the independent variables and the teaching strategy was the dependent variable. The researcher used t-Test to check the pre-test and post-test results were analyzed and Mean scores were calculated. The Mean scores of both pre-test and post-test were computed using a statistical program, and utilized a Paired Samples t-Test as the analytical method. The major purpose of using t-Test was to analyze the data to find if there was a significant difference between the means of pre-test and post-test. It was to check leadership styles and the higher secondary mathematics teachers' teaching strategy.

4.Findings

To determine the impact of leadership style on teachers teaching strategies of higher secondary mathematics teachers. The objective one aimed to determine whether there was a significant predictive impact of teaching strategy. In order to address research objective five, statistical hypothesis testing multiple regression was performed on the eight variables in the current study. An initial step, the bivariate correlations between the independent variables (telling, selling, participating, delegating, supportive, directive, remove obstacles, and achievement oriented) and the dependent variable teachers' teaching strategy were examined. If bivariate correlations were not significant for any of the independent variables with teachers' teaching strategy, it was deemed appropriate to exclude such variable from further analysis. All statistical hypothesis testing performed to assess the significance of the correlations were set using a significance level of .05, or 5%. A 5% significance level is the conventionally used maximum level in social science and behavioral science studies (Cohen, 1988).

Table 1 displays the bivariate correlations between telling, selling, participating, delegating, supportive, directive, remove obstacles, and achievement oriented and the dependent variable teachers' teaching strategy.

Table 1: Bivariate Correlation Based on the Leadership styles and Teaching Strategy

	1	2	3	4	5	6	7	8
Telling								
Selling	.305**							
	.000							
Participating	-.211**	.384**						
	.010	.000						
Delegating	.048	.355**	.588**					
	.556	.000	.000					
Supportive	.095	.480**	.208*	.763**				
	.247	.000	.011	.000				
Directive	.182*	.063	.089	.446**	.420**			
	.026	.446	.277	.000	.000			
Removes	-.076	-.201*	.231**	.451**	.202*	.665**		
	.356	.014	.004	.000	.013	.000		
Achievement	.115	-.378**	.027	.091	.068	.276**	.479**	

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	.162	.000	.741	.266	.409	.001	.000	
Teaching	.499**	-.150	.041	.196*	.097	.475**	.511**	.770**
	.000	.067	.620	.016	.238	.000	.000	.000

Note *denotes a significant relationship (statistical significant level at p = .05, two tailed). p- values appear within parentheses below the correlations coefficients.

The correlation analysis revealed that, from the eight independent variables considered in this study, selling did not have a significant relationship with teaching strategy for the (r = -.150, p = .067). This finding suggested that did not have a predictive relationship with the dependent variable addressed in this study. Hence it was deemed appropriate to exclude not significant factor from further analysis.

Participating did not have a significant relationship with teaching strategy for the (r = .041, p = .620). This finding suggested that did not have a predictive relationship with the dependent variable addressed in this study. Hence it was deemed appropriate to exclude not significant factor from further analysis.

Supportive did not have a significant relationship with teaching strategy for the (r = .097 , p = .238). This finding suggested that did not have a predictive relationship with the dependent variable addressed in this study. Hence it was deemed appropriate to exclude not significant factor from further analysis.

Telling was found to be significantly, moderately and positively correlated with the respondents teaching strategy for the (r = .499, p = .000), at significant level of .05. The coefficient of determination (r^2) for these variables was .25, which indicates that 25% of the variance in teaching strategy could be accounted by Independent variable.

Delegating was found to be significantly, weakly and positively correlated with the respondents teaching strategy for the (r = .196, p = .016), at significant level of .05. coefficient of determination (r^2) for these variables was .038 ., which indicates that 3.8% of the variance in teaching strategy could be accounted by Independent variable.

Directive was found to be significantly, moderately and positively correlated with the respondents teaching strategy for the (r = .475, p = .000), at significant level of .05. The coefficient of determination (r^2) for these variables was .23, which indicates that 23% of the variance in teaching strategy could be accounted by Independent variable.

Remove obstacles was found to be significantly, moderately and positively correlated with the respondents teaching strategy for the (r = .511, p = .000), at significant level of .05. The coefficient of determination (r^2) for these variables was .26, which indicates that 26% of the variance in teaching strategy could be accounted by Independent variable.

Achievement oriented was found to be significantly, strongly and positively correlated with the respondents teaching strategy for the (r = .770, p = .000), at significant level of .05. The coefficient of determination (r^2) for these variables was .59, which indicates that 59% of the variance in teaching strategy could be accounted by Independent variable.

Overall, eight out of three independent variables were found to be not significantly correlated with dependent variable. These findings suggested that further correlational analysis using multiple linear regression could be performed. Correlational analysis using multiple linear regression is useful to determine the predictive relationship of a combination of independent variables (i.e., the predictors) on the dependent variable (i.e., the response). Through multiple linear regression is possible to generate a predictive equation model for the dependent variable, using the relative contribution of each of the predictor variable as parameters.

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Table 2: Multiple Linear Regression for Factors Predicting Teaching Strategies for Leadership style

Variable	Coefficients	SE	t (df = 149)	*P*
(Constant)		.149	-1.986	.049
Telling	.424	.037	11.154	.000
Delegating	-.014	.048	-.344	.731
Directive	.115	.045	2.258	.025
Removes	.185	.036	3.245	.001
Achievement	.603	.031	14.513	.000
N	150			
F (5,149)	132.872			
Prob > F	0			
R	0.907			
R²	0.822			

Note. * The regression coefficients reported here for each of the predictor variables are unstandardized. An unstandardized or raw regression coefficient (often denoted described the relationship between the predictor and the dependent variable in some of the original (i.e., raw) units of measurement.

The regression analysis results shown table 0 revealed that the overall regression was significant. And there was a significant but weak multiple correlation between the combination of independent variable (telling, delegating, directive, remove obstacles, and achievement oriented) and the dependent variable (teaching strategy) r = .907, p = .000 The multiple coefficient of determinations (R^2) for these variables was .822, which indicated that 82% of the variance in leadership style to the teaching strategy.

Part # 1: Leadership Style

Table 3 and 4 present the results comparing the Means from pre-test and post-test under Part # 1: Leadership Style.

Table 3: Paired Sample Statistics (Pre-Test and Post-Test) Leadership Style

	M	*N*	Std. Deviation	Std.Error Mean
Pair 1 Pre-Test	2.6607	150	.22538	.01840
Post-Test	3.9024	150	.12338	.01007

Table 3 presents descriptive statistics for the condition of Pre-Test and Post-Test results about results about the practices of leadership style by the higher secondary mathematics teachers. From the mean, the participants scored higher (M=3.9024) than the Pre-Test (M=2.6607). The standard deviation explains that the scores on both Pre-Test (Std.=.22538) and Post-Test (Std.=.12338) were similarly dispersed.

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Table 4: The Results of Pre and Post Tests by Paired t-Test (Leadership Style)

	Paired Difference							Sig. (2-tailed
	Mean	Std. Deviation	Std.Error Mean	95% Confidence Interval of the Difference		T	Df	
				Lower	Upper			
Pair 1	-1.24167	.26219	.02141	-1.28397	-1.19936	-58.001	13	.000
Pre-Test-Post-Test								

Table 4 conveys that repeated-measures t-test found this difference to be significant since, t (150) = -58.001, p = .000 < .05 level of significance. This was supporting that there was a significant difference between the means of Pre-Test   and Post-Test.

Part #2: Teaching Strategy

Table 5: Paired Sample Statistics (Pre-Test and Post-Test) Teaching Strategies

	M	N	Std.D	Std.Error
Pair 1 Pre-Test	2.5943	150	.35572	.02904
Post-Test	3.9027	150	.15103	.01233

Table 5 presents descriptive statistics for the collection of Pre-Test and Post-Test results about the teaching strategies by the secondary mathematics teachers. From the mean, the participants scored higher (M=3.9027) than the Pre-Test (M=2.5943). The standard deviation explains that the scores on both Pre-Test (Std.=.35572) and Post-Test (Std.=.15103) were similarly dispersed.

Table 6: The Results of Pre and Post Tests by Paired t-Test (Teaching Strategies)

	Paired Difference							Sig. (2-tailed
	Mean	Std. Deviation	Std.Error Mean	95% Confidence Interval of the Difference		T	Df	
				Lower	Upper			
Pair 1	-1.30840	.40846	0.3335	-1.37430	-1.24250	-39.232	13	.000
Pre-Test -								
Post-Test								

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Table 6 conveys that repeated-measures t-test found this difference to be significant since, t (149) = -39.232, p = .000 < .05 level of significance. This was supporting that there was a significant difference between the means of Pre-Test and Post-Test.

5.Recommendations & Conclusion

The higher secondary mathematics teachers should practice the two leadership style in their class room teaching. Situational leadership style and the transactional leadership style help the higher secondary mathematics teachers teaching strategy. The higher secondary mathematics teachers practice the key variables of the situational leadership, telling selling, participating and delegating. The higher secondary mathematics teachers practice the key variables of the transactional leadership style, supportive, directive, remove obstacles and achievement oriented. They need to seek for teaching strategies, and assessment methods to obtain the learning outcomes. Preparing programs on leadership and general frame of mind to work ought to be composed for teachers. This will assist them in realizing that they are leaders in the classroom. It will help them to open a suitable leadership style for students' learning inspiration.

The result revealed that the eight out of three independent variables were found to be not significantly correlated with dependent variable. These findings suggested that further correlational analysis using multiple linear regression could be performed. Correlational analysis using multiple linear regression is useful to determine the predictive relationship of a combination of independent variables (i.e., the predictors) on the dependent variable (i.e., the response). Through multiple linear regression is possible to generate a predictive equation model for the dependent variable, using the relative contribution of each of the predictor variable as parameters. The regression analysis results revealed that the overall regression was significant. And there was a significant but weak multiple correlation between the combination of independent variable (telling, delegating, directive, remove obstacles, and achievement oriented) and the dependent variable (teaching strategy) r = .907, p = .000 The multiple coefficient of determinations (R^2) for these variables was .822, which indicated that 82% of the variance in leadership style to the teaching strategy. The model was implemented to higher secondary mathematics teachers. The results of the test showed that the new leadership model was applicable to all. However, the model would not be fully implemented due to the fact that the higher secondary mathematics teachers needed to pay more attention on leadership style and tried to adapt leadership model in their own pace. They needed time and space to progressively implement the model.

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