

A Study of the Effect of Self-Concept on Mathematics Achievement of Secondary Level Students

Moinul Hassan Ahmed

Research Scholar, Department of Education,
RKDF University, Bhopal (MP)

Prof. (Dr.) M.S. Pawar

HOD, Department of Education,
RKDF University, Bhopal (MP)

ABSTRACT: The present study has been designed to investigate the effect of the self-concept on mathematics achievement of secondary level students. The study was conducted over the sample of 100 students of class 10th of different schools of Hoshangabad (MP). Annual high school examination marks of mathematics subject were taken into consideration to measure students' mathematics achievement and the Self-concept Scale of Dr. R.K. Saraswat was used to measure students' level of self-concept. The results indicated that no significant difference found in the mathematics achievement between the high and low physical/social/temperamental/moral/total self-concept level group of students while a significant difference has been found in the mathematics achievement between the high and low educational/intellectual self-concept level group of students of secondary level. The mathematics achievement of high educational/ intellectual self-concept level students is found to be much better than low educational/ intteachual self-concept level students.

Key Words: Mathematics Achievement, Self-concept, Secondary Level.

The modern era is frequently considered to be the age of science and technology. Human inventions and discoveries have given the development of technological civilization a new dimension. In addition to opening up a vast array

of opportunities for study and development, these discoveries and technical developments have also encouraged people to live more materialistic lives. A greater effort is made to invade the mysteries of nature as a result of human curiosity's ever-increasing inclination toward obtaining materialistic comforts.

A nation's need for educated labor is on the rise since educated and competent labor is a valuable resource for any state. It is essential to start building human resources as soon as a person is born. Children should be encouraged to have reasonable aspirations for their lives, education, and future. Researchers are therefore interested in factors that are correlated with academic success. Social and psychological factors are currently becoming more significant among the correlations. Self-concept is a significant psycho-social factor that influences children's academic performance in a significant way. Uneven academic performance among pupils of equal ability is one of the most enduring conundrums that parents and teachers must deal with. The aim of current social-cognitive theories of motivation and behavior is what elements lead some pupils to push beyond their personal and environmental restrictions. Self concept is the way a person sees or perceives himself. It refers to those ideas, opinions, sentiments, attitudes, and beliefs that a person has about his or her own capabilities and place in society. The physical self, outward appearance, grooming, aptitudes, disposition, values, beliefs, and aspirations all have an impact on one's sense of self. Positive self-concept is associated with a greater capacity for tolerance. Self-confidence is linked to independence and an open mind.

This research aims to identify students' self-concept and to study their mathematics achievement, with the help of which remedial work can be done to provide a healthy environment for the students during their study. According to a study psychological instability directly affects the mathematics achievement of the

students. Jasuja S.A. (1983) founded definite decrease in mathematics achievement of students with decrease in their self-concept level. Therefore, the researcher has chosen this topic to research about the effects of self-concept on the studies of students and compares the results obtained with earlier studies.

Some research studies have also been done in the past related to the research presented like – **Fellows, Anjana (2011)** conducted a study on, To study the relationship between self-concept and academic achievement of early adolescent private and government school boys. The finding of the study revealed that there is significant relationship between self-concepts and academic achievement of boys, there is significant relationship between self-concept of private and government school boys. **Ali, S. (2011)** studied and found that the difference between mean scores of high achievers of experimental and the control group on post-test was found to be significant at 0.05 levels. Hence, there was a significant difference in achievement of mathematics students' taught and motivated using problem solving method and those taught with routine method. **Mahanta, Dibyajyoti (2014)** conducted a study on, Impact of Attitude and Self-Concept of the Students towards Mathematics upon their achievement in Mathematics. This study also revealed that Assamese medium schools, boys had more positive attitude but less negative attitude than that of the girls. The Pearson's correlation revealed a positive relationship between attitude towards mathematics and achievement. **Kumari, Monika; Lekh Ram and Barwal, Sangeeta K. (2016)** conducted a study on A Study of the Relationship between Stress and Mathematics Achievement of High School Students. The finding of the study revealed that there exist no significant relationship between stress and mathematics achievement of high school boys, there exist no significant relationship between stress and mathematics achievement of high school girls, there exist no significant relationship between stress and

mathematics achievement of rural high school students, there exist no significant relationship between stress and mathematics achievement of urban high school students. **Pandey, Bhairab Datt (2017)** conducted a study on ‘A study of Mathematical Achievement of Secondary School students’. The finding of the study revealed that there exists statistically significant difference between mathematical achievement mean scores of male and female students class X from government and private Secondary Schools of Bageshwar district and male students have better achievement in mathematics than female students. There exists a statistically significant difference between rural and urban students mathematical achievement mean scores of class X from government and private Secondary Schools of Bageshwar district and the mathematical achievement mean scores of urban students were founded higher than rural students. There exist no significant difference between the mathematical achievement mean scores of rural male/female and urban male/female students. **Kumari, Munni (2017)** conducted a study on academic achievement of senior secondary school students in relation to their anxiety and school environment. The study revealed that significant and negative relationship found between academic achievement and anxiety of senior secondary school students. More specifically, as the level of academic anxiety increases of boys/girls/students of senior secondary school, academic achievement decreases and vice-versa. **Hannelotte L. Timmerman and etc. al. (2017)** conducted a study on, The relation between math self-concept, test and math anxiety, achievement motivation, and math achievement in typically developing 12 to 14-year-old adolescents. The finding of the study revealed that a significant positive correlation was found between math self-concept and math achievement in all four math domains (measurement, relations, numbers, and scale), as well as automatized math skills. Furthermore, there was a significant negative correlation between math anxiety and math achievement in the math domain “scale”. **Barman,**

Tapas (2018) conducted a study on, Impact of Self-concept on Academic achievement of secondary school students with relation to their gender of Coochbehar District. The finding of the study revealed that there was a significant different was found between self-concept of boy and girl secondary students of Coochbehar district. There was a weak positive relationship between self-concept of girl and boy students with academic achievement.

Objectives of the Study: -

1. To study the effect of different factors of self-concept on mathematics achievement of secondary level students.
2. To study the effect of of total self-concept on mathematics achievement of secondary level students.

Hypothesis of the Study: -

1. There will be no significant effect of physical self-concept on mathematics achievement of secondary level students.
2. There will be no significant effect of social self-concept on mathematics achievement of secondary level students.
3. There will be no significant effect of temperamental self-concept on mathematics achievement of secondary level students.
4. There will be no significant effect of educational self-concept on mathematics achievement of secondary level students.
5. There will be no significant effect of moral self-concept on mathematics achievement of secondary level students.
6. There will be no significant effect of intellectual self-concept on mathematics achievement of secondary level students.

7. There will be no significant effect of total self-concept on mathematics achievement of secondary level students.

Tools of the study: - Self-concept scale of Dr. R.K. Saraswat was used to measure students' level of self-concept. In order to know the mathematics achievement of student's annual high school marks award list (session 2019-20) has been used to collect the data.

Sample of the study: -In the selection of sample by the researcher, full care was taken that with the saving of time, more accurate knowledge is obtained about the macro and it should be appropriate and above all in practical study. For this, a total of 100 students of class 10th were selected by simple random sampling method.

Research Methodology: - In present research, the researcher has done comparative effect of self-concept on mathematics achievement of class 10th students of secondary level. The researcher has used the survey method to achieve the objectives set for this study. A total of 100 students of class 10th were selected by simple random sampling method. These selected students' mathematics achievement measured by annual high school marks award list (session 2019-20) and self-concept level measured by 'Self-concept Scale' of Dr. R.K. Saraswat and necessary instructions were given to fill them. After praising these instruments on selected students, the researcher collected these data. After evaluation with the help of flannel booklet, a master sheet was prepared based on the score. Those data were analyzed through various statistical methods based on the scores entered in the master sheet.

Analysis of the Results -

Table No. – 01**Comparative results of the effect of the physical self-concept on the mathematics achievement of secondary level students**

Level of Physical Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	56	67.46	20.89	1.28	> 0.05
Low	44	61.98	21.52		

DF - 98

Table Value at 0.05 Level of Significant – 1.98

From the results Shown in the above table it is clear that the mathematics achievement mean score of high physical self-concept level students of secondary level is 67.46 and low physical self-concept level students of secondary level is 61.98, table shows that the computed mean difference is 5.48 and it is not significant because its 'CR' value obtained is 1.28, which is less than the table value 1.98 at 0.05 level of significance on degree of freedom 98, so from the statistical point of view this value is not significant.

Therefore, based on above result, it can be concluded that no significant difference has been found in the mathematics achievement between the high and low physical self-concept level students of secondary level. It means no significant effect of physical self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis 'There will be no significant effect of physical self-concept on mathematics achievement of secondary level students' is accepted.

Table No. – 02**Comparative results of the effect of the social self-concept on the mathematics achievement of secondary level students**

Level of Social Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	59	64.73	20.53	0.18	> 0.05
Low	41	65.51	22.46		

DF - 98

Table Value at 0.05 Level of Significant – 1.98

From the results Shown in the above table it is clear that the mathematics achievement mean score of high social self-concept level students of secondary level is 64.73 and low physical self-concept level students of secondary level is 65.51, table shows that the computed mean difference is 0.78 and it is not significant because its 'CR' value obtained is 0.18, which is less than the table value 1.98 at 0.05 level of significance on degree of freedom 98, so from the statistical point of view this value is not significant.

Therefore, based on above result, it can be concluded that no significant difference has been found in the mathematics achievement between the high and low social self-concept level students of secondary level. It means no significant effect of social self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis 'There will be no significant effect of social self-concept on mathematics achievement of secondary level students' is accepted.

Table No. – 03

Comparative results of the effect of the temperamental self-concept on the mathematics achievement of secondary level students

Level of Social Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	57	66.63	19.72	0.84	> 0.05

Low	43	62.95	23.16		
-----	----	-------	-------	--	--

DF - 98

Table Value at 0.05 Level of Significant – 1.98

From the results Shown in the above table it is clear that the mathematics achievement mean score of high temperamental self-concept level students of secondary level is 66.63 and low temperamental self-concept level students of secondary level is 62.95, table shows that the computed mean difference is 3.68 and it is not significant because its ‘CR’ value obtained is 0.84, which is less than the table value 1.98 at 0.05 level of significance on degree of freedom 98, so from the statistical point of view this value is not significant.

Therefore, based on above result, it can be concluded that no significant difference has been found in the mathematics achievement between the high and low temperamental self-concept level students of secondary level. It means no significant effect of temperamental self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis ‘There will be no significant effect of temperamental self-concept on mathematics achievement of secondary level students’ is accepted.

Table No. – 04

Comparative results of the effect of the educational self-concept on the mathematics achievement of secondary level students

Level of Social Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	58	70.38	18.66	2.98	< 0.01
Low	42	57.69	22.60		

DF - 98

Table Value at 0.01 Level of Significant – 2.63

From the results Shown in the above table it is clear that the mathematics achievement mean score of high educational self-concept level students of secondary level is 70.38 and low educational self-concept level students of secondary level is 57.69, table shows that the computed mean difference is 12.69 and it is significant because its ‘CR’ value obtained is 2.98, which is more than the table value 2.63 at 0.01 level of significance on degree of freedom 98, so from the statistical point of view this value is significant.

Therefore, based on above result, it can be concluded that a significant difference has been found in the mathematics achievement between the high and low educational self-concept level students of secondary level and mathematics achievement of the high educational self-concept level students is much better than low educational self-concept level students. It means a significant effect of educational self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis ‘There will be no significant effect of educational self-concept on mathematics achievement of secondary level students’ is rejected.

Table No. – 05

Comparative results of the effect of the moral self-concept on the mathematics achievement of secondary level students

Level of Social Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	56	65.59	22.26	0.29	> 0.05
Low	44	64.36	20.10		

DF - 98

Table Value at 0.05 Level of Significant – 1.98

From the results Shown in the above table it is clear that the mathematics

achievement mean score of high moral self-concept level students of secondary level is 65.59 and low moral self-concept level students of secondary level is 64.36, table shows that the computed mean difference is 1.23 and it is not significant because its 'CR' value obtained is 0.29, which is less than the table value 1.98 at 0.05 level of significance on degree of freedom 98, so from the statistical point of view this value is not significant.

Therefore, based on above result, it can be concluded that no significant difference has been found in the mathematics achievement between the high and low moral self-concept level students of secondary level. It means no significant effect of moral self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis 'There will be no significant effect of moral self-concept on mathematics achievement of secondary level students' is accepted.

Table No. – 06

Comparative results of the effect of the intellectual self-concept on the mathematics achievement of secondary level students

Level of Social Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	59	72.37	18.21	4.40	< 0.01
Low	41	54.51	21.11		

DF - 98

Table Value at 0.01 Level of Significant – 2.63

From the results Shown in the above table it is clear that the mathematics achievement mean score of high educational self-concept level students of secondary level is 72.37 and low intellectual self-concept level students of secondary level is 54.51, table shows that the computed mean difference is 17.86 and it is significant because its 'CR' value obtained is 4.40, which is more than the

table value 2.63 at 0.01 level of significance on degree of freedom 98, so from the statistical point of view this value is significant.

Therefore, based on above result, it can be concluded that a significant difference has been found in the mathematics achievement between the high and low intellectual self-concept level students of secondary level and mathematics achievement of the high intellectual self-concept level students is much better than low intellectual self-concept level students. It means a significant effect of intellectual self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis 'There will be no significant effect of intellectual self-concept on mathematics achievement of secondary level students' is rejected.

Table No. – 07

Comparative results of the effect of the total self-concept on the mathematics achievement of secondary level students

Level of Social Self-concept	N	Mean	SD	'CR' Value	'P' Value
High	52	67.96	20.59	1.43	> 0.05
Low	48	61.90	21.70		

DF - 98

Table Value at 0.05 Level of Significant – 1.98

From the results Shown in the above table it is clear that the mathematics achievement mean score of high total self-concept level students of secondary level is 67.96 and low total self-concept level students of secondary level is 61.90, table shows that the computed mean difference is 6.06 and it is not significant because its 'CR' value obtained is 1.43, which is less than the table value 1.98 at 0.05 level of significance on degree of freedom 98, so from the statistical point of view this value is not significant.

Therefore, based on above result, it can be concluded that no significant difference has been found in the mathematics achievement between the high and low total self-concept level students of secondary level. It means no significant effect of total self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

On the bases of the above result, our pre decided null hypothesis ‘There will be no significant effect of total self-concept on mathematics achievement of secondary level students’ is accepted.

Conclusion: -

1. No significant difference has been found in the mathematics achievement between the high and low physical/social/temperamental/moral/total self-concept level group of students. It means no significant effect of physical/social/temperamental/moral/total self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.
2. A significant difference has been found in the mathematics achievement between the high and low educational/intellectual self-concept level students of secondary level and mathematics achievement of the high educational/intellectual self-concept level students is much better than low educational/intellectual self-concept level students. It means a significant effect of educational/intellectual self-concept level (high and low) is found on the mathematics achievement of the students of secondary schools.

Bibliography

Books-

1. **Best, J.W. (1999)** Research in Education, Prentice Hall of India, New Delhi
2. **Chaube, S.P. (1999)** Education Psychology and Educational Statistics, Laxmi Narayan Agarwal, Agra, Fourth Revised and Enlarged Edition

3. **Esyencck, H.J.(1970)** The Structure of Human Personality, Methuen & Co. Ltd., London
4. **Guilford, J.P. (1956)** Fundamental Statistics in Psychology and Education, Kogakusha Company Ltd., Tokyo
5. **Good, C.V. (1973)** Dictionary of Education, Mcgraw-Hill Book Co., New York, Pg. No. 7
6. **Hurlock, E. (1969)** Personality Development, Mcgraw-Hill Book Co., NY
7. **Kulshrestha, S.P. (2004)** Educational Psychology, R. Lall Book Depot, Meerut
8. **Kundu, G.L. and Tutoo, G.N. (1991)** Educational Psychology, Sterling Publisher Pvt. Ltd., New Delhi
9. **Singh, Arun Kumar (2005)** Educational Psychology, Bharti Bhawan Publisher and Distributor, Patna

Related Research -

1. **Ali, S. (2012)** “The impact of motivation on students’ academic achievement in mathematics in problem based learning environment”, *Unpublished Dissertation, BU Bhopal*
2. **Barman, Tapas (2018)** “Impact of Self-Concept on Academic Achievement of Secondary Students with Respect to their Gender of Coochbehar District.” *ZENITH International Journal of Multidisciplinary Research, Vol.8 (8), AUGUST (2018), pp. 87-101*
3. **Fellows, Anjana (2011)** “To study the relationship between self-concept and academic achievement of early adolescent private and government school boys”, *Research Hunt, Volume 6, Issue 4, December 2011, Page No. 8-11*
4. **Hannelotte L. Timmerman, Sylke W.M. Toll & Johannes E.H. Van Lutt (2017)** “The relation between math self-concept, test and math anxiety, achievement motivation, and math achievement in typically developing 12 to 14-year-old adolescents. *Psychology, Society, & Education, Vol. 9(1), 2017, pp. 89-103*

5. **Kumari, Munni (2017)** “A Study of Academic Achievement of Senior Secondary School Students in Relation to their Anxiety and School Environment”, *International Journal on Arts, Management and Humanities, Volume 7(1), 2017, Pg. No. 4-9*
6. **Kumari, Monika; Lekh Ram and Barwal, Sangeeta K. (2016)** “A Study of the Relationship between Stress and Mathematics Achievement of High School Students.”, *International Journal of Advanced Research in Education and Technology (IJARET), Volume 3, Issue 2, April-June 2016, page no.203-206*
7. **Mahanta, Dibyajyoti (2014)** “Impact of Attitude and Self-Concept of the Students towards Mathematics upon their achievement in Mathematics.” *International Journal of Theoretical & Applied Sciences, 6(1): 20-35(2014), page no. 20-35*
8. **Pandey, Bhairab Datt (2017)** “A study of Mathematical Achievement of Secondary School students”, *International Journal of Advance Research (IJAR), Volume 5(12), December 2017, Page No. 1951-1954.*