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Impact of Problem Solving Ability onAcademic Achievement among Secondary School Students

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Abstract

The present study is concerned with assessing the impact of problem solving ability on academic achievement of secondary school students.The researcher employed the standardized tool of Problem Solving Ability (PSA; Dubey, 2010) to measure problem solving ability of secondary students while academic performance was assessed in terms of aggregate marks of secondary students. A sample of 309 secondary school students was taken from different schools of Central Kashmir. The investigator used statistical techniques to compute the data, i.e. mean, SD, Pearson Product Moment Correlation and multiple linear regression. The findings uncoveredthat the significant positive association between problem solving ability and academic achievement. Further, Problem solving ability passed on criterion as a significant predictor of academic achievement$R^2 = 0.178$, F (1, 307) = 66.27, p< 0.01.

Keywords: Academic Achievement, Problem Solving Ability, Secondary School Students

Humans have been endowed with many unique abilities andskills (Kumari and Pujar, 2014)**.**These abilities and skills develop gradually in a dynamic way. Life skills are "living skills or abilities" for adaptive and positive behaviour that enables individual to deal effectively with the challenges and problems of everyday life (World Health Organisation, 1997). Problems are inseparable part of an individual and how to comprehend the problems depends on ability of an individual (Kumar and Singh, n.d). Thus, problem solvingability is crucial element in life skills. It involves critical thinking, analytical thinking, creative skills and logical reasoning of complex nature. Critical thinking is as sign of human cognition and helps an individual set an aim and make strategy which could be helpful to reach the set goal, this ability is called problem solving. "Problem solving competency is an individual's capacity to engage in cognitive processing, to understand and resolve problem situation where a method of solution is not immediately obvious"(OCED, 2012, p.4). Nazir and Nasrin (2019) "Problem solving involves engaging an individual in any errand for which solution is not known" (p.335).In nascent times, problem solving ability has been received great public interest as an imperative ability in digital era. Problem solving is key elements of success and

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has been regarded as important aspect of academic achievement. Academic achievement implies the net result of an individuals' effort over a period of time. It shows the level of proficiency attained by individual in scholastics or academic work (Imam and Khatoon, 2012). Problem solving ability plays significant role in students' academic achievement (Gakhar&Aseema, 2004). Effective problem solving ability results in better academic success (Adesoji, 2008).Nidhi and Singh (2014) also certified that development of problem solving ability certainly enhanced mathematical achievement among students.Thus, it is demand of modern society and challenge for educational institutes to enhance problem solving among students.

Rationale of the Study

"By 2030 in India, 53% students will leave secondary school without getting skills needed for decent jobs"(Business Insider India, November, 2019). Thus, it is imperative for any educational institute to develop skills or abilities among students to solve problem. Students should be entangled with challenging situation inclassroom so that their skill get nourished which will render them to solve problems effectively. It has been observed that problem solving skills stimulates learning abilities. Concepts of novice ideas and ways of solving problems must be inculcated among students so that they can be productive in their achievement.

Operational Definitions

Problem solving ability

The operational definition of problem solving ability is the scores attained by high school students on Dubey's problem solving ability test.

Academic achievement

The operational definition of academic achievement is the score obtained by the students in terms of aggregate marks during the academic session (2017-2018) conducted by the state board of Jammu and Kashmir.

Objectives

I. To study the descriptive measures of problem solving ability and academic achievement among secondary school students

II. To examine the relationship between problem solving ability and academic achievement of secondary school students.

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III. To identify the predictionof problem solving ability on academic achievement of secondary school students.

Hypotheses

H_1: There will be positive relationship between problem solving ability and academic achievement of secondary school students.

$H_{2:}$ The regression coefficient of problem solving ability on academic achievement will be other than zero.

Method

The present research comprises of descriptive survey method and selected a sample of 309 secondary school students from different schools of Kashmir valley (Central Kashmir) through random sampling technique. The researcher employed the standardized tool of Problem Solving Ability (PSA; Dubey, 2010) to measure problem solving ability of secondary students while academic performance was assessed in terms of aggregate marks of secondary students. The investigator used appropriate statistical techniques to compute the data as per the requirement of the objectives. Keeping in view the objectives, mean, standard deviation, correlation and regression were used. However, statistical package for social sciences (SPSS) version (20) was utilized to analyse the data.

Data Analysis

Objectives 1: To study the descriptive measures of problem solving ability and academic achievement among secondary school students.

To find out the nature and description of the variable, descriptive statistics (Mean, Standard Deviation, Skewness and Kurtosis) were calculated.

Table 1

Descriptive Measures

Variable	N	Mean	SD	Skewness	Kurtosis
Problem solving ability	309	6.57	2.521	.899	.934
Academic achievement	309	62.71	24.012	2.179	3.923

Table 1 depicts descriptive measures of problem solving ability and academic achievement of secondary school students, where mean score is 6.57 and 62.71 respectively. The standard

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deviation has value of 2.521 for problem solving ability and 24.012 for academic achievement. It also reveals the coefficient of skewness and kurtosis which is 0.899 and 0.934 respectively for the variable problem solving ability. The coefficient of skewness for academic achievement is 2.179 and kurtosis is 3.923. Kline (1998) suggests that the skewness and kurtosis indices should notbe higher than an absolute value of 3 and 8, respectively. This stipulates that the data of present research is normally distributed.

Objectives 2: To examine the relationship between problem solving ability and academic achievement of secondary school students.

H_1: There will be positive relationship between problem solving ability and academic achievement of secondary school students.

To testH_1Pearson product-moment of correlation was employed and the value of coefficient of correlation was obtained.

Table 2:

Relationship between Predictive Variable and Criterion Variables for Secondary School Students

Predictive variables	Criterion variable (Academic Achievement) (N= 309)
Problem Solving Ability	.421**

*** Correlation is significant at the 0.01 level (2-tailed).*

The stated table 2 elucidates the value of the coefficient of correlation between problem solving ability and academic achievement for secondary school students is found to be significant, $r = 0.421$, $p < 0.01$. This clearly demonstrated that variation (either increase or decrease) in problem-solvingability is bound to cause similar changes in the academic achievement. Thus, (H_1)"*There will be positive relationship between problem solving ability and academic achievement of secondary school students*" stands supported.

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Objectives 3: To identify the prediction of problem solving ability on academic achievement of secondary school students.

H_2: The regression coefficient of problem solving ability on academic achievement will be other than zero.

To testH_2Multiple Linear Regression Analysis was used to identify the significant prediction of problem solving ability on academic achievement of secondary school students. Before performing the analysis, variables wereexamined for fulfilment of the assumptions of Multiple Linear Regression e.g.,Linearity, Multicollinearity, Normality, and Independence which are shown in Table 3.

Table 3

Robustness Check for Multiple Regression Analysis

Test of Robustness							
Model	Criterion	R^2	Linearity Residual Plots	Multicollinearity Tolerance& VIF (Range: ToI: 0-1, VIF:1-9)	Normality pp plot	Independence Durbin Watson (Range DW<3)	Whether Robustness Verified
			1	2	3	4	
1	Y	.178	Satisfied	ToI: 1.000 VIF: 1.000	Satisfied	1.321	All Satisfied

Y= Academic achievement

Thus, the above table 3 clearly explicit that Robustness Check for Multiple Regression (Linearity, Multicollinearity, Normality, and Independence) is satisfied.

Table 4

Problem Solving Ability as Predictor of Academic Achievement

Predictor	B	R	R^2	ΔR^2	*F*	*df*	p
Problem-solving ability							
			(Model Y = a+β*X)				
X	.421	.421	.178	-	66.27	(1, 307)	.000
Constant	36.34						

Y= Academic achievement

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Problem solving ability was considered as predictor and academic achievement as criterion to develop regression model. Problem solving ability passed on criterion, as a significant predictor of academic achievement and the magnitude of predictability is 17.8% as represented by R^2 = 0.178, *F* (1, 307) =66.27, *p*< 0.01. There is ample substantiate to conclude that the slope of regression line is not zero. Therefore, (H_2)"*The regression coefficient of problem solving ability on academic achievement will be other than zero*" stands supported at 0.01 level of significance.

Findings and Discussion

The outcome uncovered that a significant positive relationship was found between problem solving ability and academic achievement. A similar finding was corroborated by other researcher as Parimala (2016) indicated that significant and positive relationship between problem solving ability and academic achievement in chemistry among higher secondary students. It was also found that problem solving ability passed on criterion as a significant predictor of academic achievement. A similar finding was endorsed by other researcher as Salami and Aremu (2006) indicated that problem solving ability is significant predictor of study behaviour. Patricia and Eugene (1995) also revealed that techniques used in problem solving served as predictor of scholastic achievement.

Conclusion

The concept of problem solving ability has received considerable attention and has been regarded as a measure of success. Problem solving ability can be assessed, how efficientlyan individual resolvesthe impediments and effectively get over it. From the present research, it has also been evident that change in problem solving ability is associated with change in academic achievement. Problem solving ability plays a pivotal role to influence academic achievement positively.It is recommended to the parents and teachers that theyshould create conducive and creative environment for the development of problem solving ability.

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