

Effect of Certain Demographic Variables on Problem Solving Ability

Usma Nazir¹ & Nasrin²

¹Research Scholar, Department of Education, Aligarh Muslim University,
Aligarh, Uttar Pradesh, India-202002

²Professor, Department of Education, Aligarh Muslim University,
Aligarh, Uttar Pradesh, India-202002

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ABSTRACT: *Problemsolving is the ability of an individual to come out with the solutions to a problem by using a systematic thought process. Problemsolving is basically a process where creative thinking is processed in finding out a solution to the problems. This present research was intended to study the effect of demographic variables viz., gender and dwelling on the problemsolving ability of secondary school students. The present study was carried on a sample of 154 secondary school students from the Kashmir valley. In order to assess the problemsolving ability among secondary school students, a standardised questionnaire of problemsolving ability test by Dubey (2010) was used to collect the data. The collected data was computed with the help of SPSS software by using various descriptive and inferential statistical techniques like Mean, Standard Deviation and Two-Way ANOVA. The findings of the study showed a significant main effect of gender on problem solving ability among secondary school students $F(1, 150) = 27.955, p < 0.01$. The study also inferred that significant main effect of dwelling on problem solving ability among secondary school students $F(1, 150) = 4.030, p < 0.01$. Further, the study also indicated significant interaction effect of gender and dwelling on problem solving ability among secondary school students $F(1, 105) = 48.524, p < 0.01$.*

Key Words: *Gender, Dwelling and Problem solving ability*

Introduction

A person's ability is illustrated in the way as he comprehends the issues. Most of the individuals face many impediments in their lives and they strive hard to find various ways to solve the problems. The problem solving implies engaging an individual in any errand for which the solution is not known. It involves objective analysis of the problem, which indeed is the sign of human cognition. It helps the individuals to organise the aim and make strategies that will help them to reach the specific goal. It is the framework which involves critical thinking, analytical thinking, creative skills and logical reasoning of complex nature takes place. Problem solving is not an activity that requires only information on the subject matter but also using appropriate methods. Problem solving is a significant aspect of progress and has been viewed as one of the vital component of human behaviour. Good problem-solvers have a "scientific disposition" they analyse the problematic situations carefully and systematically through a scientific approach.

Garofalo & Lester (1985) Problem solving ability includes higher order cognition like "visualization, association, abstraction, comprehension, manipulation, reasoning, analysis, synthesis, generalization—each needs to be 'managed' and 'coordinated" (p. 169).

Significance of the Study

The important objective of any educational institute is to develop problem solving skills among their students. Therefore, instead of providing them ready-made material, a teacher should help her students in analysing the problem in different ways, make them understand the real cause so that they may come up with different solutions. Contrary to that, our educational system has major flaws in overlooking the requirements, abilities, capabilities of students and the same stereotypical strategies are being implemented in our educational institutes to learn the things in the same environment. This is definitely an insuperable impediment in bringing out the creative-self within the students. Problem solving ability is not important in educational matters only but it also plays a significant role in our day to day lives as well. It facilitates the students to construct their robust cognitive ability, it enables them to remain in a superior and encourages them to understand the advantages of high academia. Hence, the investigator has tried to explore the difference in problem solving ability (PSA) with respect to gender and dwelling.

Operational Definition**Problem Solving Ability**

Problem solving ability is operationally defined as the scores obtained by the secondary school students of JKBOSE on Dubey's problem solving ability test (2010).

Variables involved in the present study

Criterion variable: Problem solving ability

Predictive variables: Gender and Dwelling

Objectives of the Study

- To study the descriptive measures and normality of problem solving ability among secondary school students.
- To find out the differences in problem solving ability of secondary school students in terms of gender and dwelling.

Hypothesis of the study

To analyse the objectives of the present study the null hypothesis was formulated:

- H_0 : There is no significant difference in problem solving ability of secondary school students in terms of gender and dwelling.

Methodology

The objective of the study is the comparison of Problem Solving Ability among Secondary School Students in terms of gender and dwelling. For this purpose, the prerequisite is to collect information about problem solving ability from male and female secondary school students, and from rural and urban secondary schools students. Thus, a descriptive research method has been used for the present study.

Sample of the Study

For the present study, the investigator selected the Secondary School Students from central Kashmir. The researcher selected (N=154) secondary school students in which (male=76, female=78) and (rural=68, urban=86) by using random sampling technique.

Tools Used For Data Collection

For the present study, the researcher used a problem solving ability test constructed and validated by Dubey (2010) to collect the data. The problem solving ability test consists of 20 items.

Delimitation of the study

The present study is delineated to the students of class IX and X

The present study is restricted to the central Kashmir (Srinagar).

The present study is delimited to gender (male and female).

The present study is confined to dwelling rural and urban).

Statistical techniques

To analyse the collected data, the following appropriate statistical techniques (Mean, SD and two-way ANOVA) were used with the SPSS (V.20).

Data Analysis

Analysis of data is essential for any exploratory work. It brings order, structure and meaning to the obtained data. Keeping in view the objectives of the study, the present researcher has made an endeavour to analyse the obtained data.

Objective 1: To study descriptive measures and normality of problem solving ability among secondary school students.

To assess the descriptive measures of problem solving ability, the basic statistics like (Mean, Standard deviation, skewness and kurtosis) have been employed.

Table 1: Descriptive Measures to know the level and Normality of problem solving ability

Problem solving ability	N	Mean		Std. Deviation	Skewness		Kurtosis	
		Mean	Std. Error		Statistic	Std. Error	Statistic	Std. Error
	154	6.84	.204	2.53	-.125	.195	-.169	.389

Table 1 depicts descriptive statistics of problem solving ability, where mean is 6.84 shows lower scores as per the standards of the test. The standard deviation has value 2.53, which reflects that the scores may deviate only 2.53 on both positive and negative side. It also reveals the skewness and kurtosis whose value is (-0.125 and -0.169) respectively and the z- value of skewness and kurtosis is(0.64 and -0.43) respectively which falls under the standard of Z value (± 1.96) Doane and Seward (2011). This stipulates that the data of problem solving ability is normally distributed. The graphical representation of normally distributed data in problem solving ability is shown in figure1.

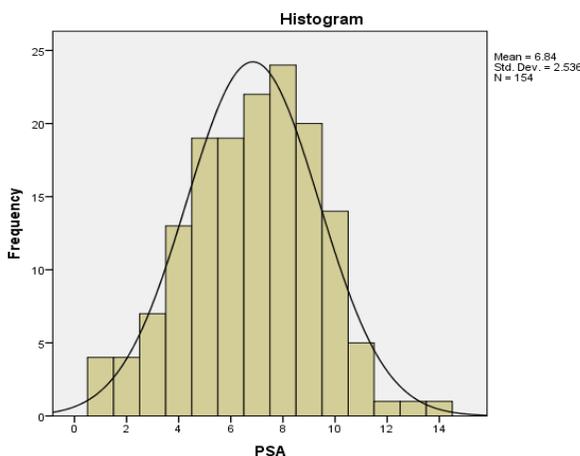


Fig 1: Normal distribution of data of Problem Solving Ability

Objective 2: To study the differences in problem solving ability of secondary school students in terms of gender and dwelling.

H_{01} : There is no significant difference in problem solving ability of secondary school students in terms of gender and dwelling.

Table 2: 2x2 ANOVA for the score of PSA according to gender and dwelling

Source		N	Mean	Sum of Square	Df	Mean square	F	Sig.
Gender	Boys	76	7.88	140.634	1	140.634	27.955**	.000
	Girls	78	5.83					
Dwelling	Rural	68	7.15	20.276	1	20.276	4.030**	.046
	Urban	86	6.46					
Gender*Dwelling				48.524	1	48.524	9.646**	.002
Error				754.605	150	5.031		
Total				8198.000	154			

**Significant at 0.01 level

A two-way ANOVA was employed to study the effect of gender and dwelling on the problem solving ability of secondary school students. It was found that there is a significant main effect of gender on problem solving ability of secondary school students $F(1, 150) = 27.955, p < 0.01$. Thus it was observed that male students ($M=7.88$) are better than females ($M= 5.83$) in problem solving ability. The graphical representation of the mean difference between boys and girls is presented in figure 2.

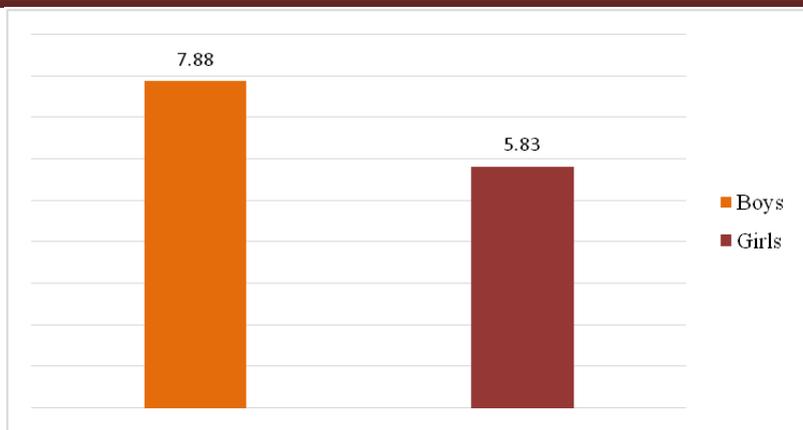


Fig 2: Mean difference between boys and girls in PSA

Table 2 further reveals that there is a significant main effect of dwelling on problem solving ability among secondary school students $F(1, 150) = 4.030, p < 0.01$. Thus it was observed that rural students ($M = 7.15$) are better than urban students ($M = 6.46$) in problem solving ability. The graphical representation of the mean difference between rural and urban students in problem solving ability is presented in figure 2.1

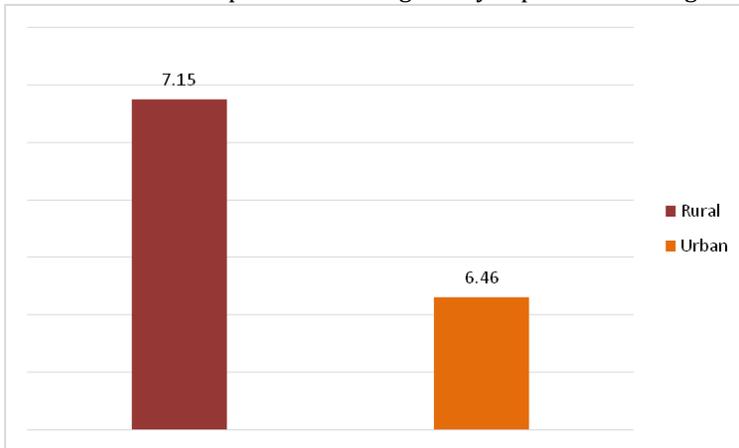


Fig 2.1: Mean difference between rural and urban students in PSA

The said table 2 also reflects the significant interaction effect of gender and dwelling on problem solving ability among secondary school students $F(1, 105) = 48.524, p < 0.01$. Thus it can be inferred that certain demographic variables (gender and dwelling) significantly interact with each other. The graphical representation of the interaction effect is shown in figure 2.2. Hence, all the values of F are significant at 0.01 level. Thus the null hypothesis H_0 "There is no significant difference in problem solving ability of secondary school students in terms of gender and dwelling" is rejected

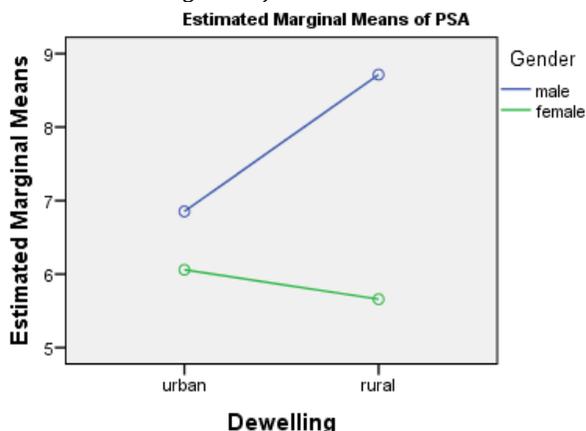


Fig 2.2: Interactional effect of gender and dwelling on problem solving ability

The fig 2.2 represent the interaction effect of gender and dwelling on the problem solving ability. The figure shows lower problem solving ability among urban males as compared to rural males. Whereas urban females have higher problem solving ability than rural females. This explicit first-order interaction is observed as the lines candidly intersect each other when extended. Therefore, on account of the graph, it can be safely concluded that there is an interaction effect of gender and dwelling on problem solving ability.

Discussion

Problem solving ability and Gender

So far as the result from the above hypothesis is concerned, it was observed that boys and girls differ significantly in problem solving ability test. Boys have performed better than girls (Table 2). The result of the study is concurred with the findings of (Kannan, Sivapragasma, Senthilkumar 2016; Kolayis, Turan, Ulusov 2012; Ganandevan, 2006; Brens and Johnson, 1986) who found a significant difference between male and female in problem solving ability

Problem solving ability and Dwelling

It is explicit from the above (Table 2) that there is a significant difference between urban and rural secondary school students on problem solving ability test. This conclusion got evidence with the findings of (Misra, 1986; Manjula and Nataraj, 2012) who reported a significant difference in problem solving ability among rural and urban students.

Conclusion

The present research is a genuine attempt to find out the effect of gender and dwelling problem solving ability. The researcher concluded that there is a significant difference in the problem solving ability between male and female secondary school students. It was also observed significant differences in the problem solving ability between rural and urban secondary school students. Further, the study also indicated a significant interaction effect of gender and dwelling on problem solving ability among secondary school students.

Educational Implications

Problem solving skills are related to the intelligence, creativity of students, reasoning and logical ability. Therefore, it is indispensable to inculcate the problem solving ability among the students. In order to inculcate problem solving ability among secondary school students following suggestions were made.

- The educators should connect the subject matter with real-life situations. So that students could solve problems that comes in their way.
- It is recommended that teachers and parents should find special ways for the development of the problem solving skills among students.
- It is propounded that teachers should make use of scientific and modern techniques of teaching and learning in order to inculcate problem solving skills.
- It is also propounded that students must be provided with a conducive atmosphere that flourishes the skills to solve the impediments
- Inquiry orientation task and activities can be helpful in developing the attitude of solving problems.
- There should be an updated training program for teachers where emphasis should be on how to develop the skills of solving problems among students.
- Individual difference of students should be taken into consideration and teachers should design their methodology and use pedagogical strategies to sort out students' problems and foster the abilities of problem solving

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