Impact of Cognitive Style on Problem solving Ability among Undergraduates

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Introduction

Problems are inseparable part of human life. One solves a problem in a particular way by which he satisfies himself while solving the problem. In this way he develops a style for solving the problem. Thus each person has a unique style of his own.

Cognition is the acquisition of knowledge which involves a series of mental skills. Neisser (1967) defines cognition as the process by which the sensory input is transformed, reduced and elaborated, stored, recovered and used. Haber (1969) identified cognition as synonymous to human information processing. Djoudi (1950) and Mukerjee (1993) stressed the need of using cognitive strategies to attain the mastery of learning. These are the potentially conscious activities functions. It is used while learning to promote better learning and retention of learning for longer period.

Cognitive style has been viewed from different angles. According to Harvey (1963) cognitive style is the way an individual filters and processes stimuli so that the environment takes on psychological meaning. Goldstein and Blackman (1978) define cognitive style as a hypothetical construct that has been developed to explain the process of mediation between stimuli and responses. Here the term cognitive style refers to the characteristic way in which individuals conceptually organize the environment.

Cognitive style has been developed so that relationship between Stimulus and Response can be understood. By using it an individual can manipulate and organize his environment in certain ways. Cognitive style refers to the way an individual responds to his stimulus.

Objectives

- To study the impact of cognitive styles on problem solving ability of undergraduates.
- To study the difference between score of problem solving ability of integrated and split style male undergraduates.
- To study the difference between scores of problem solving ability of integrated and split style of female undergraduates.
- To study the effect of subject stream on the problem solving ability of undergraduates.

Hypotheses

$H_0$ There exists no significant difference between score of problem solving ability of integrated and split style undergraduates.
H$_1$ There exists no significant difference between score of problem solving ability of integrated and split style male undergraduates.

H$_2$ There exists no significant difference between scores of problem solving ability of integrated and split style of female undergraduates.

H$_3$ There exists no significant difference between score of problem solving ability of science and non-science undergraduates.

Sample
The sample consists of 200 male and female undergraduates from various disciplines studying in different colleges located in Durg district (C.G.).

Tools
- Cognitive Style Inventory by Jha (1983)
- Problem Solving Ability by Dubey (2008)

Analysis and Discussion
To test the hypotheses data was collected accordingly and scoring was done as per the procedure stated in the manuals. According to the scores obtained by the cognitive style inventory all the subjects were categorized into five types of cognitive styles as systematic, intuitive, undifferentiated, integrated and split. Since a less member of students fall in systematic, intuitive, and undifferentiated style, they were not taken for further studies. Statistical analysis was employed on the scores obtained from subject of integrated and split type of cognitive style.

To find out the impact of cognitive style on problem solving ability ‘t’ test was employed and findings are as follows.

Table No. 1
Table showing mean, standard deviation and ‘t’ value of problem solving ability of integrated & split style undergraduates

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th>( \sigma )</th>
<th>( t ) – value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Integrated Style undergraduates</td>
<td>70</td>
<td>12.8</td>
<td>4.00</td>
<td>1.53</td>
</tr>
<tr>
<td>2.</td>
<td>Split style undergraduates</td>
<td>109</td>
<td>11.19</td>
<td>3.62</td>
<td></td>
</tr>
</tbody>
</table>

\( df = 177, P > .05, \text{Not significant} \)

Table no. 1 shows that calculated ‘t’ value for problem solving ability scores of integrated and split style undergraduates is less than table value at .05 level of significance. It indicates that there is no significant difference between the problem solving ability of integrated and split style undergraduates. The shown difference may be due to some error.
Table No. 2
Table showing mean, standard deviation and ‘t’ value of problem solving ability of integrated & split style male undergraduates

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th></th>
<th>( \bar{X} )</th>
<th>t – value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Integrated Style male</td>
<td>34</td>
<td>11.76</td>
<td>4.29</td>
<td>0.133</td>
<td></td>
</tr>
<tr>
<td></td>
<td>undergraduates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Split style male undergraduates</td>
<td>54</td>
<td>11.61</td>
<td>3.89</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( \text{df} = 86, \text{ P} > .05, \text{ Not significant} \)

It is revealed from table no. 2 that there is no significant difference between the problem solving ability scores of integrated and split style male undergraduates since the obtained t-value is less than the table value at 0.05 level of significance, the difference between mean may be due to some error.

Table No. 3
Table showing mean, standard deviation and t-value of problem solving ability of integrated & split style female undergraduates

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th></th>
<th>( \bar{X} )</th>
<th>t – value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Integrated Style female</td>
<td>36</td>
<td>12.38</td>
<td>3.67</td>
<td>2.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>undergraduates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Split style female undergraduates</td>
<td>55</td>
<td>10.78</td>
<td>3.28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( \text{df} = 89, \text{ P} < .05, \text{ Significant} \)

Table no. 3 indicates that obtained ‘t’ value is 2.14 which is more than the table value at .05 level of significance, hence the value is significant. It means female undergraduates of integrated style differ in their problem solving ability to that female undergraduates having split style. Since the mean value of female undergraduates of integrated style is greater than split style undergraduates hence it can be concluded that integrated style female undergraduates are better problem solver.

So it can be inferred that in female undergraduates cognitive style plays a significant role on their problem solving ability.

Moreover a female with an integrated style is a good problem identifier and a good problem solver. Imagination and its critical analysis is very important in solving any problem. The nature of females of integrated style is very practical and rational. Hence, there exists a significant difference between the problem solving ability of integrated and split style female undergraduates.
Table No. 4
Table showing mean, standard deviation and ‘t’ value of problem solving ability of science and non-science undergraduates

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Groups</th>
<th>N</th>
<th>M</th>
<th>( \sigma )</th>
<th>t – value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Science undergraduates</td>
<td>57</td>
<td>14.4</td>
<td>4.03</td>
<td>8.07</td>
</tr>
<tr>
<td>2.</td>
<td>Non-science undergraduates</td>
<td>122</td>
<td>10.2</td>
<td>2.83</td>
<td></td>
</tr>
</tbody>
</table>

\( df = 177, \quad P < .01, \quad \text{Significant} \)

Table no. 4 shows that calculated ‘t’ value is greater than the table value at .01 level of significance (\( df = 177 \)). The mean score indicates the difference in problem solving ability of science and non-science undergraduates. Science undergraduates are better problem solver than their counterpart non-science undergraduates. The undergraduates from science stream are well versed with mathematical operations, formulae, calculations logical reasoning etc.

**Conclusion**

It can be concluded from the study that cognitive style has no impact on problem solving ability of undergraduates. Integrated and split style undergraduates both are having average and above average problem solving ability.

In case of male undergraduates, cognitive style also does not play any significant role in - Problem solving ability. But in female undergraduates it plays a significant role upon problem solving ability, significant difference was found in the problem solving ability of integrated and split style female undergraduates. It was found that female subjects of integrated type of cognitive style were found to have good problem solving ability. Maximum of female subjects come in the range between an average and a high ability to solve the problem. The persons with an integrated style are able to change their actions quickly and with an ease relating to the situation. Generally girls are more sincere, disciplined and punctual towards their work as compared to the boys who are more rigid and casual. Moreover, girls are known to take a harmonious decision suiting to the current need.

A significant difference was also accounted in the problem-solving ability of science and non-science undergraduates. Discipline of study has a major role in determining the degree of problem-solving ability. The subjects belonging to science streams are found to be good in problem solving as compared to their counterpart non-science undergraduates. The reason behind this may be because science facilitates logical reasoning, imagination of problem, abstract thinking at reflective level etc.

**References**


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