A STUDY ON THE IMPACT OF EMOTIONAL INTELLIGENCE OF THE SECONDARY SCHOOL STUDENTS OF WEST BENGAL ON THEIR ACHIEVEMENT IN MATHEMATICS

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ABSTRACT

The purpose of the present investigation was to find out strata-wise (sex and caste) comparison of the variable emotional intelligence and also verify the impact of emotional intelligence on mathematics achievement of the secondary students of West Bengal, in other words, it also enquires the interrelationship between the variables and how mathematics achievement can be predicted from emotional intelligence. Students’ achievement was recorded in terms of scores obtained in Madhyamik Examination –2012 under WBBSE and emotional intelligence scores of the students was obtained by using Mangal Emotional Intelligence Inventory, after due restandardization and modifications. It is revealed from the study that sex contributes a lion’s share on emotional intelligence. The variables under study are not significantly correlated and hence, achievement in mathematics cannot be predicted by scores of emotional intelligence.

Key Words: Emotional intelligence, Achievement / Examination performance in mathematics.

INTRODUCTION

The academic battle between accepting and denying emotions in educational scenario is a longstanding debate. The integration of emotions in intelligence for cultivation of life success has been hinted by Payne not before 1986. From the research trends, since nineties, emotional intelligence and emotional quotient (EQ) have been widely used in English vocabulary as a cultural trend or a scientific concept. A large numbers of researchers in this field are suggesting that emotional intelligence helps developing social and emotional competence of individuals that are urgently needed for everyone in our present tension ridden society.

At the most general level, emotional intelligence (E.I.) refers to the ability to recognize and regulate emotions in ourselves and other (Goleman, 2001). Peter Salovey and John Mayer (1997), defined emotional intelligence as: “The ability to perceive emotion, integrate emotion to facilitate thought understand emotions, and to regulate emotions to promote personal growth.” Another eminent researcher of the emotional intelligence construct is Reuven Bar-
On, the originator of the term “emotional quotient (E.Q.)”, he defines emotional intelligence as being concerned with understanding oneself and others, relating to people, and adapting to and coping with the immediate surroundings to be more successful in dealing with environmental demands (Bar-On, 1997).

Too much fog surrounds the concept of emotional intelligence. Undoubtedly, it is a function of brain. It is concerned with processing and utilization of emotional information. It is different from cognitive intelligence.

Academic success has been investigated from different angles such as relation to cognitive processes (including intelligence) and personality factors. It was believed that successful cognitive processing could not occur at the same time as emotional processing. More specifically, rational and logical thinking could not occur when emotional information was also being processed (Humphery, Curran, Morris, Farrell, and Woods, 2007). So students would be unable to engage in effective and fruitful decision making processes if their emotional processes entered into the equation. In contrast, the contemporary research trend focuses on how emotions, in particular emotional intelligence (E.I.), may enhance decision making and academic success academic achievement. Humphery et al. suggested that cognitive and emotional processing cannot be separated and that emotional processing is an integral and important component of rational thought, as long as emotions are not in excess.

Emotional intelligence in school context is an interesting area of research, as it may contribute to the educational process of the participants. According to Chabot (2000), emotional intelligence has been features: emotional control; self-esteem, impulse control, stress management, social skills, and balance communicating skills, communicate in an efficient way with the others, management of their aims and goals, self motivation and positive attitude.

PROBLEM

Goleman (1995) suggested that emotional intelligence can predict academic success better than traditional intelligence. He stressed that intelligence (IQ) alone is no more the measure of success. According to him, intelligence account for only 20% of the total success. And that the rest goes for emotional and social intelligence. Finnegan (1998) argued that school should help students learn the abilities underlying the emotional intelligence. He believes this could lead to achievement from formal education years of the child.

Parker, Summerfeldt, Hogan and Majeski (2004) they discovered that various emotional and social competencies were strong predictors of academic success. Similarly, Parker, et al. (2003) found emotional intelligence to be significant predictors of academic success. Low and Nelson (2004) reported that the skills underlying in emotional intelligence are key factors in the academic achievement and test performance of high school and college students respectively. Likewise, Abisamra (2000) reported that there is a positive relationship between emotional intelligence and academic achievement. He therefore suggested that inclusion of emotional intelligence in the schools curricula. Petrides, Frederickson, Furnham. Cotton and Wiklund (2005) argued that any investigation of the potential effects of emotional intelligence on academic performance must be pursued in a specific context. In essence, the importance of emotional intelligence on academic achievement has been found to be very significant.

On the contrary, Zeidner, et al. (2002) pointed out that there has been insufficient research conducted to fully understand the impact that emotional intelligence may (or may not) have on academic success. Up to this point, research has provided conflicting evidence regarding the relation between emotional intelligence and academic success, which is often measured by GPA (Grade point Average). The conflicting evidence may be, in part, a result of the great variability in emotional intelligence measures available. In particular, research using the Assessing
Emotions Scale (AES) found small correlations between emotional intelligence and GPA, ranging from correlations of 0.20 to 0.32. Research using the Mayer, Solvey and Caruso emotional intelligence Test (MSCEIT) has not observed any correlations between emotional intelligence and GPA (Bastian, Burns and Nettelbeck, 2005; O’Cannor and Little, 2003).

The research trend in this field cannot yet find out any universally accepted positive relationship between emotional intelligence and academic success and whether emotional intelligence bears any significant contribution on academic achievement, especially in mathematics. Under this prominent controversial juncture, the researchers tried to examine the impact of independent variable (emotional intelligence) on dependent variable (Achievement/Examination Performance in mathematics) on the students of West Bengal. A study was, therefore, designed as “A study of the impact of emotional intelligence of the secondary school students of West Bengal on their achievement in mathematics”.

OBJECTIVES OF THE STUDY

1. To administer the emotional intelligence inventory on the XI class students of West Bengal.
2. To appraise the extent of emotional intelligence of the students, to tabulate the scores and find their mean.
3. To tabulate the score of the emotional intelligence inventory sex-wise and caste-wise and find the corresponding means.
4. To determine the significance of difference in the scores of emotional intelligence (sex-wise and caste-wise).
5. To determine the interrelationship between the two variables - emotional intelligence and achievement (Examination performance) in mathematics,
6. To ascertain whether achievement (Examination performance) in mathematics could be predicted from the independent variable - emotional intelligence.
7. To find the significance of difference in mean scores in examination performance in mathematics of the students belonging to high and low emotional intelligence groups.

HYPOTHESES OF THE STUDY

The researcher framed the following hypotheses for the study:

1. There exists a significant difference between mean emotional intelligence scores of Boys and that of Girls.
2. There exists a significant difference between mean emotional intelligence scores of General caste students and that of other caste students.
3. There exists a significant difference between mean emotional intelligence scores of General caste Boys and that of other caste Boys.
4. There exists a significant difference between mean emotional intelligence scores of General caste Girls and that of other caste Girls.
5. There exists a significant difference between mean emotional intelligence scores of General caste Boys and that of General caste Girls.
6. There exists a significant difference between mean emotional intelligence scores of other caste Boys and that of other caste Girls.
7. Emotional intelligence scores obtained by the students were highly correlated with their achievement scores in mathematics.
8. Achievement scores in mathematics could be predicted from emotional intelligence scores.
9. The high and low achievers in emotional intelligence Inventory would respectively score high and low in achievement scores in mathematics.

DELIMITATION OF THE STUDY

1. The study considered two variables: emotional intelligence and achievement (Examination performance) in mathematics.
2. The study was confined to students of West Bengal of Class-XI (just promoted) of Bengali medium schools under WBBSE.
3. No. of students comprised 118 boys and 98 girls selected from 18 higher secondary schools from West Bengal.

TOOLS

1. The researcher adapted “Mangal Emotional Intelligence Inventory “which was developed and standardized by Dr. S. K. Mangal and Mrs. Shubhra Mangal (2009). The inventory consists of 100 items covering four dimensions of emotional intelligence namely, (a) Intra-personal awareness (own emotions) – 25 questions (b) Inter-personal awareness (others emotions) – 25 questions (c) Intra-personal management (own emotions) – 25 questions (d) Inter-personal management (others emotions) – 25 questions.

After eliminating 5 items from each dimension on the basis of suggestions from experts, the test was translated into Bengali and restandardized. After restandardization, there remain total 54 items, with reliability of 0.58 by $KR_{20}$ method. Each item has two alternative response, Yes and No. For scoring, one mark is to be provided for the response indicating presence of emotional intelligence and zero for the absence of emotional intelligence.

2. In this study, the terms “Achievement” and “Examination performance” have been used interchangeably. The marks obtained by the students belonging to the sample of the study in the Secondary Examination (Madhyamik Pariksha) – 2012 in mathematics were considered as Examination performance scores in mathematics. Examination performance is treated as non-standardized achievement test prepared and moderated by a number of subject experts, and administered by West Bengal Board of Secondary Education (WBBSE) and the scoring key has sufficient objectivity and items have wide content coverage covering different objectives and large number of items.

SAMPLE AND SAMPLING TECHNIQUES

In the study, the population is the entire students of West Bengal who have just passed Madhyamik Examination – 2012 under West Bengal Board of Secondary Education (WBBSE) in Bengali medium and admitted in class-XI under West Bengal Council of Higher Secondary Education (WBCHSE) without considering their stream of study.

The researcher used cluster sampling in which selected 6 (six) districts from North and South Bengal in the ratio 1:2 randomly. Then the researcher selected higher secondary (H.S) schools from the selected districts preserving randomness as far as possible. The researchers selected 12 students from each of the 3 schools of each selected district. So the sample size of the study was $(12 \times 3 \times 6) = 216$. The selected districts are: Malda and CoochBehar from North Bengal and Howrah, North 24-Parganas, Purbo Medinipur and Birbhum from South Bengal.
TABLE: 1 - STRATA-WISE CLASSIFICATION OF TOTAL SAMPLE

<table>
<thead>
<tr>
<th>Caste/Sex</th>
<th>General Caste</th>
<th>Other Caste</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>76</td>
<td>42</td>
<td>118</td>
</tr>
<tr>
<td>Girls</td>
<td>67</td>
<td>31</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>143</td>
<td>73</td>
<td>216</td>
</tr>
</tbody>
</table>

COLLECTION OF DATA

Typed standardized questionnaires of Emotional Intelligence Inventory in Bengali version (adapted, translated and restandardized) were given to every selected student in a plenary session and necessary directions and examples were given at the very outset. Then the researchers instructed the students for giving responses on the given tool within set time limit. The researcher also collected marks of every selected student in mathematics in Madhyamik Examination-2012 from school authority.

After completion of the inventory, response scripts were checked by the researcher on the basis of specified scoring key. The score obtained by each student was tabulated and then statistically analyzed.

PRESENTATION OF DATA

When, \[ EI = \text{Emotional Intelligence} \]
\[ AM = \text{Achievement in Mathematics} \]

TABLE: 2 - STRATA-WISE NO. OF STUDENTS AND CORRESPONDING MEAN AND S.D. OF THE TESTS EI AND AM

<table>
<thead>
<tr>
<th>Strata</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EI</td>
<td>AM</td>
</tr>
<tr>
<td>Boys</td>
<td>118</td>
<td>35.898</td>
<td>88.92</td>
</tr>
<tr>
<td>Girls</td>
<td>98</td>
<td>33.571</td>
<td>56.83</td>
</tr>
<tr>
<td>General caste</td>
<td>143</td>
<td>34.462</td>
<td>63.84</td>
</tr>
<tr>
<td>Other caste</td>
<td>73</td>
<td>35.589</td>
<td>62.64</td>
</tr>
<tr>
<td>General caste Boys</td>
<td>76</td>
<td>35.053</td>
<td>67.84</td>
</tr>
<tr>
<td>Other caste Boys</td>
<td>42</td>
<td>37.43</td>
<td>70.88</td>
</tr>
<tr>
<td>General caste Girls</td>
<td>67</td>
<td>33.791</td>
<td>59.30</td>
</tr>
<tr>
<td>Other caste Girls</td>
<td>31</td>
<td>33.10</td>
<td>51.48</td>
</tr>
<tr>
<td>Total Sample</td>
<td>216</td>
<td>34.843</td>
<td>63.44</td>
</tr>
</tbody>
</table>

In case of EI, average score of boys is higher than girls irrespective of caste factor. It is also found that all strata except other caste girls have almost same variability.
Mean score of AM for boys is considerably higher than girls irrespective of caste factor. There is a noticeable difference between the pairs Boys and Girls, other caste boys and other caste girls. It is observed that variability of AM is same for all strata except other caste girls.

ANALYSES OF DATA

**TABLE: 3 - SHOWING T-VALUES BETWEEN DIFFERENT STRATA OF EI SCORES**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Strata</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>P-value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Boys</td>
<td>98*</td>
<td>36.38</td>
<td>7.29</td>
<td>2.66</td>
<td>0.008</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>98</td>
<td>33.57</td>
<td>7.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>General caste</td>
<td>73*</td>
<td>33.95</td>
<td>7.92</td>
<td>-1.30</td>
<td>0.196</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Other caste</td>
<td>73</td>
<td>35.59</td>
<td>7.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>General caste Boys</td>
<td>42*</td>
<td>35.00</td>
<td>7.04</td>
<td>-1.52</td>
<td>0.133</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Other caste Boys</td>
<td>42</td>
<td>37.43</td>
<td>7.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>General caste Girls</td>
<td>31*</td>
<td>35.16</td>
<td>7.82</td>
<td>1.15</td>
<td>0.256</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Other caste Girls</td>
<td>31</td>
<td>33.10</td>
<td>6.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>General caste Boys</td>
<td>67*</td>
<td>34.79</td>
<td>6.76</td>
<td>0.78</td>
<td>0.436</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>General caste Girls</td>
<td>67</td>
<td>33.79</td>
<td>7.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Other caste Boys</td>
<td>31*</td>
<td>37.39</td>
<td>7.75</td>
<td>2.40</td>
<td>0.020</td>
<td>S at 0.05 but NS at 0.01</td>
</tr>
<tr>
<td></td>
<td>Other caste Girls</td>
<td>31</td>
<td>33.10</td>
<td>6.27</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Sample size is reduced to equalize with the other stratum for the sake of conformity of the distributions.

It is evident from the Table-3 that there is no significant difference of mean scores of EI between the pairs General Caste-Other Caste, General Caste Boys- Other Caste Boys, General Caste Girls-Other Caste Girls and General Caste Boys- Other Caste Boys even at 5% level of significance. There is a significant difference of mean scores in the pair Boys-Girls at 1% level of significance and in the pair Other Caste Boys-Other Caste Girls at 5% level of significance but not at 1% level of significance. So, the hypotheses 2, 3, 4 and 5 are rejected and hypotheses 1 and 6 are accepted 1% and 5% level of significance respectively.

**TABLE: 4 SUMMARY OF RESULTS OF ANOVA FOR EI SCORES WITH RESPECT TO SEX AND CASTE FACTOR**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>371.8</td>
<td>1</td>
<td>371.8</td>
<td>7.031</td>
<td>0.009*</td>
</tr>
<tr>
<td>Caste</td>
<td>33.6</td>
<td>1</td>
<td>33.6</td>
<td>0.636</td>
<td>0.426</td>
</tr>
<tr>
<td>Sex X Caste</td>
<td>112.0</td>
<td>1</td>
<td>112.0</td>
<td>2.118</td>
<td>0.147</td>
</tr>
</tbody>
</table>

*Significant at 1% level of significance*
CORRELATION AND REGRESSION

It is found that there is a Low (r = 0.124) linear relationship (p value = 0.069) between the two variables viz. EI and AM.

Regression equation of AM on EI is:

\[ AM = 49.9 + 0.388 \times EI \]

Beta – co-efficient is not significant even at 0.05 level of significance (P value = 0.069). So, we can say that overall AM could not be predicted from the scores of EI.

TABLE: 5 SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF EXAMINATION PERFORMANCE IN MATHEMATICS SCORES AS OBTAINED BY HIGH SCORE GROUP AND LOW SCORE GROUP IN EI INVENTORY.

<table>
<thead>
<tr>
<th>N</th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>P-value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Low</td>
<td>70.5</td>
<td>20.6</td>
<td>0.39</td>
<td>0.699</td>
<td>NS</td>
</tr>
<tr>
<td>30</td>
<td>High</td>
<td>68.2</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 5 it is evident that there is no significant difference between high and low achievers in EI Inventory would not respectively be the high and low in AM.

FINDINGS

1. It is observed that no significant difference exists at 5% level on mean scores of EI for all strata except the two pairs Boys and Girls and other caste boys and other than girls. Only the difference between mean scores of EI among Boys and Girls is significant at even 1% level.
2. From analysis of variance, it is evident that only sex has a significant impact on the variability of EI.
3. The correlation (r = 0.124) between the two variables (EI and AM) is found very low.
4. From the regression analysis, it is revealed that the scores of AM cannot be predicted from the scores of EI.

CONCLUSION

1. It is found that the mean difference is comprehensively significant when only sex factor is taken into account.
2. It is also seen that the variability of EI is influenced significantly by the sex factor, but caste and the interaction between the two factors have no such significant contribution.
3. The studied two variables are not significantly correlated.

DISCUSSION

In order to do more legitimacy to the investigation, the sample size should have to be increased sex-wise, caste-wise, grade-wise. The cluster sample with more cautiously prepared standardized test could unearth the objective reality between the variables. The present study was conducted to one class level only, for better validation; investigation
in different class levels should have been undertaken. For several constraints the above ideal condition could not be achieved by the investigator.

The relation between emotional intelligence and overall or subject-wise academic achievement could not be uniquely determined by different investigators. They found dichotomous results in different studies in different settings. Findings of the first group of researchers suggest that emotional intelligence and related non-traditional measures of intelligence and human performance are more predictive of success than traditional IQ tests and other standardized measures of academic ability and achievement (Nelson and Low, 1976-2003; Gardner, 1983, 1993, 1997; Sternberg, 1985, 1995; Goleman, 1995, 1998; Dryden and Vos, 1994; Astin and Astin, 1993; Townsand and Gephardt, 1997; Weisenger, 1985, 1998; Cooper and Sawaf, 1997; Epstein, 1998). Research finding suggests that emotional intelligence and emotional skills are related to achievement, career success, and personal well-being (Low, 2000).

On the other hand, the second group of investigators found and argued that there is no significant correlation between emotional intelligence and academic achievement. Correlations between emotional intelligence and academic grades are in the r = 0.20 to 0.25 range for college students (Barchard, 2003; Brackett & Mayer, 2003, Lam & Kirby, 2002; Parker, Crecque, Barnhart, Harris Irons, Majeski, Wood, Bond, & Hogan, 2004) and r = 0.28 to 0.32 range for high school students (Parker, Summerfeldt, Hogan, & Majeski, 2004). When general intelligence and personality are partialled out, then, the relationship between emotional intelligence and academic grades drops to non-significant in some studies (Barchard, 2003, Brackett & Mayer, 2003; Lam & Kirby, 2002).

In the present study, findings resemble the findings of the second group of investigators, where correlation between the two studied variables are not significant and achievement in mathematics could not be predicted from emotional intelligence scores.

**SUGGESTIONS FOR FURTHER STUDIES**

1. A study like this may also incorporate the relation between the emotional intelligence and other school subjects.
2. Large and diverse sample covering all the regions of West Bengal proportionally may be considered.
3. The study may be repeated for different grades and for different Education Boards.

**REFERENCES**


(d.n.f. = date not found)