CRITICAL THINKING ABILITY OF HIGHER SECONDARY SCHOOL STUDENTS

By

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ABSTRACT

Critical thinking ability is one among the life skills enlisted by the World Health Organisation. Citizens who can think critically are the need of the nation. The new era warrants persons who can think and evaluate the information correctly. It is the duty of education to inculcate the skill of critical thinking in the students, the future citizens. The study was conducted using the normative survey method. The sample for the present study consisted of 640 secondary school students from different schools of Palakkad district. A tool, namely Critical Thinking Ability Test for Higher Secondary School Students was constructed and standardized by the investigators for the study. The study investigated the influence, the effect of gender, type of management and the optional subject on the critical thinking ability of higher school students. Statistical measures such as t-test and ANOVA were used to analyze the data. The result of the analysis shows that a significant difference exists in the mean scores of critical thinking ability with respect to gender, type of management and optional subjects of students.

Keywords : Critical Thinking Ability, Higher Secondary Students.

INTRODUCTION

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness (APA, 2010). Critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way. People who think critically, consistently attempt to live rationally, reasonably, and empathically. They are keenly aware of the inherently flawed nature of human thinking when left unchecked. They strive to diminish the power of their egocentric and sociocentric tendencies. They use the intellectual tools that critical thinking offers-concepts and principles that enable them to analyze, assess, and improve thinking (Dewey, 1909). They work diligently to develop the intellectual virtues of intellectual integrity, intellectual humility, intellectual civility, intellectual empathy, intellectual sense of justice and confidence in reason. The present century is witnessing the rapid development in all fields. The realm of knowledge is developing day-by-day. Its effect is also seen in the field of education. In the traditional educational system, importance was given only to accumulate knowledge. But now, the scenario has changed. Educational system now concentrates upon developing life skills in the learners, thereby making them fully equipped for confronting their life ahead. Critical thinking is one such life skill. It is the ability to think critically, evaluate or judge the value of the knowledge, solve problems, observe keenly, etc. National Council of Educational Research and Training (NCERT, 2005) strongly recommends the need for developing the life skills and thinking skills in learners. Now-a-days, one gets great exposure to information through different media. Only that person who can reflect on this information will be able to know whether it is acceptable or not. Otherwise, he

will be deceived. It is the responsibility of education to develop these skills in the learners, which the century warrants. It is by keeping this in mind, issue based curriculum was implemented in the schools. A person who can think critically will achieve a lot in every aspect of his life. As the students are the future nation makers, it is a must to equip them with these thinking skills. Then only, they can lead the nation to the top most position of the world.

1. Review of Related Literature

Studies reveal that, the club activities, extensive reading (Eftekhary and Kalayeh, 2014), implementing technology in the teaching-learning process (Bob, 2009), higher studies and experience (Laura, Witsberger, Wesniller, Zullo and Hoffman, 2008) has a great influence on the learners' critical thinking ability. Aliakbari and Sadeghdaghighi (2011) in their study reported the effect of gender and field of study on the critical thinking ability of students. Mitrevski and Zajkov (2012) in their study found that, physics lab and practical works is not effective in terms of stimulating critical thinking skills and also found that, gender difference does not exist in terms of students' achievement in Physics. The World Health Organization (WHO, 1999) has listed ten core life skills. They are: Problem-solving, Critical thinking, Effective communication, Decision-making, Creative thinking, Interpersonal relationship, Self-awareness, Empathy, Coping with stress and Coping with emotions. For Burden and Byrd (1994), critical thinking skill is a higher-order thinking skill that requires active participation of a set of cognitive skills. Ernst and Monroe (2006) in their study "The effects of environment based education on students' critical thinking skills and disposition toward critical thinking" found that, environment-based education has a positive effect on the students' critical thinking skills.

2. Statement of the Problem

The present study is entitled as "Critical Thinking Ability of Higher Secondary School Students".

3. Objectives of the Study

To test whether there exists any significant difference in the mean scores of critical thinking ability for the relevant subsamples based on gender (Female/Male), Type of Management (Aided/Government), and Optional Subject (Science/Commerce/Humanities).

4. Hypotheses of the Study

To test the objectives, the researcher formulated the following hypotheses:

1. There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Gender (Female/Male).
2. There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Type of Management (Aided/Government).
3. There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Optional Subject (Science/Commerce/Humanities).

5. Methods

The normative survey method was found most suitable for the study. The study is designed with a single variable, namely 'critical thinking ability'. The classificatory variables used are gender (male, female), type of management (aided, government), and optional subjects of students (science, commerce, humanities). The sample was selected from different higher secondary schools of Palakkad district. Six hundred and forty students studying in 12^{th} standard were selected as the sample. The data required for the study were collected using Critical Thinking Ability Test for Higher Secondary School Students, which was constructed and standardized by the investigators. Statistical techniques such as t-Test and ANOVA were used to analyse the data.

6. Data Analysis

6.1 Hypothesis 1

There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Gender (Female/Male).

The result of the statistical analysis of difference in the mean scores of critical thinking ability of female and male higher secondary school students is presented in Table 1.

Variable	Gender	N	M	SD	CR	p
Critical Thinking Ability	Female	318	34.00	7.63	3.64**	p<.01
	Male	322	31.88	7.14		

** The difference is significant at .01 level of confidence.

Table 1. Test of Significance of Difference in the Mean Scores of Critical Thinking Ability of Female and Male Higher Secondary School Students

Table 1 shows that, the critical ratio for the test of significance of difference in the mean scores of critical thinking ability of female (M = 34.00, SD = 7.63) and male (M = 31.88, SD = 7.14) higher secondary school students is found to be 3.64, which is greater than the table value 2.58 at .01 level of confidence.

The difference in the mean scores of female and male students is graphically represented in Figure 1.

As the obtained critical ratio (3.64) is greater than the table value (2.58) at .01 level of significance, the difference in the mean scores of critical thinking ability of female and male students is significant. Hence, the hypothesis "There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Gender (Female/Male)" is accepted. It can also be inferred from the analysis that, female students have high critical thinking ability when compared to male students. On the contrary, King, Mines, and Wood (1990) and Mohammadi, Heidari and Niryi (2012) have found that, male students have more critical thinking ability than female students; and Eftekhary and Kalayeh (2014) reported that, gender has no influence on the critical thinking ability. The present study shows that, female students have high critical thinking ability than male students. This may be due to the characteristics of the sample selected by the investigator for the study. The difference may be due to the more care and opportunities given by the parents and the society to the girl child. Especially in Kerala, females get more opportunity for academic advancement. Female students may have been discussing the problems with one another and communicating with elders than male students.

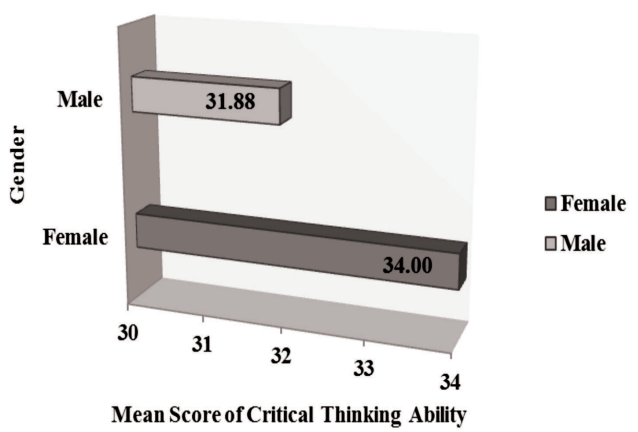

Figure 1. Difference in the Mean Scores of Critical Thinking Ability of Female and Male Higher Secondary School Students

6.2 Hypothesis 2

There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Type of Management (Aided/Government).

The significance of the difference in the mean scores of students of aided and government higher secondary school was statistically analyzed using students' t-test. The result of the t test is presented in Table 2.

Table 2 shows that, the critical ratio for the test of significance of difference in the mean score of aided (M = 33.92, SD = 7.52) and government (M = 32.01, SD =7.29) higher secondary school students are found to be 3.25, which is greater than the table value (2.58) at .01 level of significance. Thus it can be inferred that, the difference in the mean scores of critical thinking ability of higher secondary school students is significant at .01 level of significance. Hence, the Hypothesis 2 can be accepted.

The difference in the mean scores of students of aided and government higher secondary school is graphically represented in Figure 2.

Table 2 and Figure 2 shows that, students of aided schools have high critical thinking ability when compared to

Type of Management	n	M	SD	CR	p
Aided	310	33.92	7.52	3.25**	p<.01
Government	330	32.01	7.29		

** The difference is significant at .01 level of confidence.

Table 2. Test of Significance of Difference between the Mean Scores of Critical Thinking Ability of Students of Aided and Government Higher Secondary School

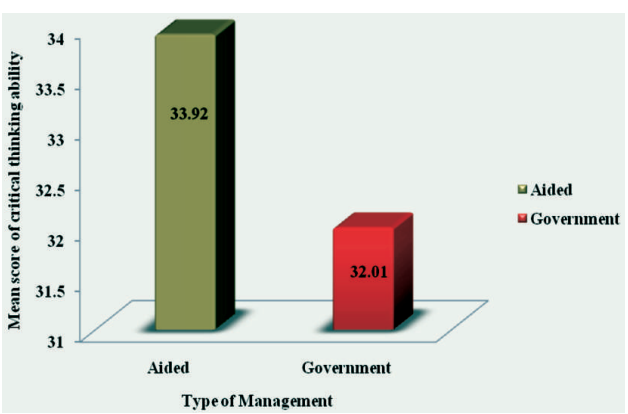

Figure 2. Difference in the Mean Scores of Critical Thinking Ability of Students of Aided and Government Higher Secondary School

government higher secondary schools. The difference may be due to the improved learning facilities offered by aided schools in terms of libraries, computer lab, laboratories, etc. The students of aided schools get more opportunities to participate in club activities like literary club, natural club, social club, etc. These may be the reasons for the difference in the critical thinking ability of students of aided and government higher secondary schools.

6.3 Hypothesis 3

There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Optional Subject (Commerce/Humanities/Science).

The investigator used One-way Analysis of Variance (ANOVA) to find the significance in the difference of the mean scores of critical thinking ability of students who pursue their studies by taking commerce, humanities and science as their main subject.

In the preliminary part of the analysis, the investigator met the condition of normality of the distribution and also the condition of the distribution of a sample randomly in the groups. The assumption of homogeneity of data is also met by the test of homogeneity of variance. Hence, all the assumptions of ANOVA are fully met by the investigator. The mean and standard deviation of each group is presented in Table 3.

To test the significance of difference in the mean scores, the investigators applied ANOVA. The result of the test of significance of difference in the mean scores of critical thinking ability of Commerce, Humanities and Science students is given in Table 4.

Group	n	M	SD
Commerce	218	33.12	7.52
Humanities	214	30.07	7.36
Science	208	35.69	6.38

Table 3. Descriptive Statistics of Critical Thinking Ability of Commerce, Humanities and Science Students

Source of Variation	SS	df	MS	CR	p
Between Groups	3339.49	2	1669.74	33.011**	p<.01
Within Group	32220.01	637	50.58		
Total	35559.50	639			

** The difference is significant at .01 level of significance.

Table 4. The Test of Significance of Difference in the Mean Score of Critical Thinking Ability of the Students of Commerce, Humanities and Science

From Table 4, it can be noted that, the obtained critical ratio is 33.011, which is much greater than the table value 4.65 to be significant at .01 level. Thus it can be inferred that, the difference in the mean scores of the critical thinking ability of commerce, humanities and science students is significant at .01 level of significance. For further analysis, the investigator conducted a Scheffe's post hoc test. The result of post hoc analysis is given in Table 5.

From Table 5, it is evident that, the difference in the mean score of critical thinking ability of students of Science and Commerce subject (2.57) is significant at .05 level of confidence.

It can be inferred that, the difference in the mean scores of critical thinking ability of students of Science and Humanities (5.62) is significant at .05 level of confidence.

The mean difference in the scores of critical thinking ability of students of Commerce and Humanities subjects is 3.04, which is greater than the table value at .05 level of confidence. Therefore, it can be inferred that, there exists a significant difference in the mean score of critical thinking ability of the students of commerce and humanities.

Group (I)	Group (J)	Mean Difference (I-J)	p
Science	Commerce	2.57*	p<.05
Science	Humanities	5.62*	p<.05
Commerce	Humanities	3.04*	p<.05

* The difference is significant at .05 level of confidence.

Table 5. Scheffe's Post hoc Test of Difference Among the Mean Score of Students of Commerce, Humanities and Science Group

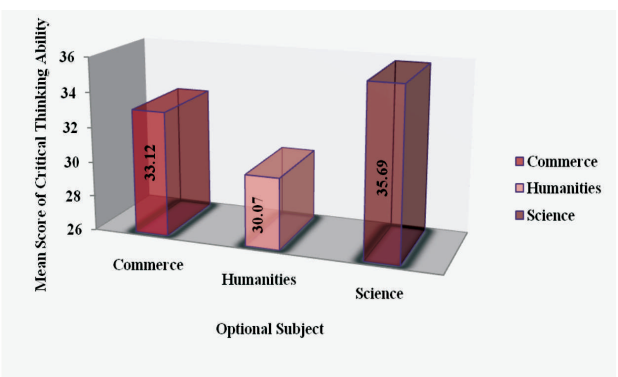

Figure 3. Difference in the Mean Scores of Critical Thinking Ability of Commerce, Humanities and Science Students

The difference in the mean scores of critical thinking ability of students of Science, Commerce and Humanities group is graphically represented in Figure 3.

The result of ANOVA shows that, the difference in the mean scores of the students of commerce, humanities and science group is significant. Hence, the hypothesis 3 is accepted. It is also evident that, the mean score of critical thinking ability of science students is significantly greater than commerce and humanities students (King, Wood, & Mines, 1990). This may be due to the nature of subjects they are studying. The abstract nature of science always require critical thinking skills. The experiments included in the science subjects may enhance the critical thinking ability of students.

7. Major Findings of the Study

- There exists a significant difference in the mean scores of critical thinking ability of higher secondary school students with respect to their gender. Female students possess high critical thinking ability when compared to that of male students.
- There exists a significant difference in the mean scores of critical thinking ability of higher secondary school students of aided and government schools. The mean score of students of aided schools is greater than the government schools.
- There exists a significant difference in the mean scores of critical thinking ability for the sub-samples based on Optional Subject. The students of science show higher critical thinking ability than that of commerce and humanities subject.

8. Educational Implication

The findings of the study reveal that, gender, type of management and optional subject have differential effect on the critical thinking ability of higher secondary school students. It is the duty of parents as well as teachers, governments and other administrators to restructure the field of education in order to develop the ability of the learners to think critically. The study shows that, aided school students have more critical thinking ability than government school students. The academic environment of government schools should be improved; so that, the learners can get wide exposure to the world of knowledge. Teachers should take initiative in conducting programmes like debates and organization of different clubs in the school, where the students will get an opportunity to exercise on their ability to think critically on issues around them.

Similarly, means for developing the skill of critical thinking should be embedded in each and every subject. The present study shows that, science students have high critical thinking ability than the commerce and humanities students. Steps should be taken to avoid this condition. Extensive reading, club activities can enhance the critical thinking ability of the learners. So this should be incorporated with the curriculum.

Conclusion

The finding of the study reveals that, gender, type of management and their subject of study has a great influence in the critical thinking ability of higher secondary school students. The government schools should improve the infrastructural facilities and there should be provision for technology integrated learning. At the same way, more activities should be integrated in the humanities and commerce subjects. It should be more life-oriented. Then it is possible to develop a citizen according to the need of the era.

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