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Research Article

Relationship Between Cognitive Flexibility And Academic Achievement Of Higher Secondary Students

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ABSTRACT

The present study aimed to study the "Relationship between Cognitive Flexibility and Academic achievement, of higher secondary students". Objectives of the study is to study the relationship between cognitive flexibility and academic achievement of higher secondary students with respect to gender, type of management and course of study. Normative survey method was adopted for the present study. The present study was conducted in Puducherry Union Territory, India. A sample of 807 higher secondary students studying in XII standard in Puducherry region by adopting random sampling technique. Cognitive Flexibility Scale constructed and validated by the investigators (Santhi. S & Dr. S. Veena, 2022) and achievement scores from the school record was used as the research instrument. Achievement marks were collected from school records. Descriptive and differential analysis were applied for further analysis. Findings of the study revealed there exist a positive and significant relationship between cognitive flexibility and academic achievement. It was also found that the is no significant difference in cognitive flexibility based on gender, type of management and course of study.

Keywords: Cognitive flexibility, Academic achievement, gender, type of management, course of study.

Introduction

Cognitive flexibility is a person's ability to coincide with cognitive information preparing and processing strategies in emerged and unexpected conditions in the environment. Cognitive flexibility is a thought series and capability to reoriented thinking stream associating with changing of faced conditions' stimulators. On the other hand, Tan (2005) formulated cognitive flexibility as individual cognitive resilience, accordance ability, and comprehending new ideas for variable circumstances and different perceptions from several resources. Shah (2003) added it is the individual capacity to rapidly inducing ideas and adjust mental conditions toward recent and emerged stimulators. Since every complication has various solutions, in which flexible individual is constructing new mental representations or amending previous representation. Academic achievement is the measurement of student achievement across various academic subjects. It is important for the successful development of higher secondary students to face the challenges in the society. In this technologically equipped digital world it is important to improve the academic achievement of higher secondary students. Hence, this study aimed to find the contributing factors of Academic achievement of higher secondary students.

Need and Significance of the study

Prior research with higher secondary students has demonstrated that increased cognitive flexibility relates to lower levels of anxiety, higher levels of motivation (Timarova & Salaets, 2011), positive perceptions of group work (Myers et. al., 2009), bilingualism (Teubner-Rhodes et al., 2016). These findings, together with those that indicate that cognitive flexibility impacts learning, language development (Deak, 2004; Jacques & Zelazo, 2005), and math skills (Bull & Scerif, 2001), suggest there could be a link between cognitive flexibility and achievement in academic settings. Nature bestowed humans with emotions. Academic achievement of higher secondary students is determined by several

Hence, the investigator intended to study the relative influence of Cognitive flexibility of higher secondary students based on selected variables.

Statement of the problem

The topic chosen for the present study is entitled as, "Relationship between Cognitive flexibility and Academic achievement of Higher secondary students".

Review of Literature

Emad Mohamad Al-Zoubi (2020), had studied about Cognitive Flexibility among Higher Education Students, The study aimed to inspect the quality of life (QOL) and its relation with cognitive flexibility among higher education students according to gender, accumulative average, and academic year. The results found that there is a positive statistically significant relationship between QOL (overall scale) and cognitive flexibility (overall scale), there is a positive statistically significant relationship between adaptive cognitive flexibility and QOL (quality of health, social and family life, education and learning, emotional life, mental health, and time management). Also, in a study carried out by **Rode et al. (2007),** they predicted that emotional intelligence was related to Academic achievement for two reasons. Firstly, Academic achievement involves a great deal of uncertainty. Secondly, majority of academic work is self-directed, requiring high levels of self-management. Thus, students that possess high emotional intelligence would perform better academically. **Svetlana (2007),** suggests the need to incorporate emotional intelligence training into secondary education curricula, due to a significant relationship between emotional intelligence and academic achievement.

Method of study

Normative survey method was adopted for the present study.

a) **Area of the study:** The present was conducted in Puducherry Union Territory, India.
b) **Variables:** Cognitive flexibility is the dependent variable of the study. The sub-variables grouped are gender, type of management and course of study
c) **Sample and sampling Technique:** The present study includes a sample of 807 higher secondary students studying in XII standard in Puducherry Region by adopting random sampling technique.
d) **Tools used:** Cognitive Flexibility Scale –constructed and validated by the investigators (Santhi. S & Dr. S. Veena, 2022).
e) **Statistical Techniques:** Discriptive and differential analysis were applied for interpretation of the collected data to arrive at meaningful conclusions.

Definitions of the Terms

a) **Cognitive Flexibility**: Cognitive flexibility is a person's ability to coincide with cognitive information preparing and processing strategies in emerged and unexpected conditions in the environment.
b) **Academic achievement**: Academic achievement refers to the extent to which a student, has attained the learning outcomes or educational goals. Student achievement can be measured through a student's grade point average, or by the amount of academic content they learn in a given time period. In this study XI standard annual examination marks of higher secondary students from school records were considered as the achievement scores.

Objectives of the study

1) To study the level of Cognitive flexibility of higher secondary students.
2) To find out the significance of difference if any in between the higher secondary students' Cognitive flexibility based on (a) Gender; (b) Type of Management; and (c) Course of study.
3) To study the level of academic achievement of higher secondary students.
4) To find out the significance of difference if any in between the higher secondary students' academic achievement based on (a) Gender; (b) Type of Management; and (c) Course of study.
5) To find out the significant difference between Cognitive flexibility and Academic achievement of higher secondary students.

Hypothesis

1) The level of Cognitive flexibility of higher secondary students is low.
2) There is no significant difference between the higher secondary students' Cognitive flexibility based on (a) Gender; (b) Type of Management; and (c) Course of study.
3) The level of Academic achievement of higher secondary students is low.
4) There is no significant difference between the higher secondary students' Academic achievement based on (a) Gender; (b) Type of Management; and (c) Course of study.
5) There is no significant difference between Cognitive flexibility and Academic achievement of higher secondary students.

Analysis and Interpretation

Hypothesis: The level of Cognitive flexibility of higher secondary students is low.

Table 1: Descriptive analysis of cognitive flexibility scores of higher secondary students

Variable	Sub-Variable	N	Mean	SD
Gender	Male	472	84.24	9.73
	Female	336	84.63	10.04
Type of Management	Government	61	84.74	10.72
	Private	747	84.37	9.79
Course of Study	Arts	249	84.33	10.11
	Science	559	84.43	9.75
Total		**808**	**84.40**	**9.86**

Table shows the mean and standard deviation of Cognitive flexibility scores with respect to the sub-samples. Higher secondary school students' overall Cognitive flexibility scores are average level (Low<75, Average 75-94, and High>94) and it ranges from 84.24 to 85.38 out of maximum of 120.
Hence from the above table, it is inferred that Cognitive flexibility of higher secondary school students is at average level.
While observing the mean scores of higher secondary students based on the subsamples gender, type of management and course of study is also average.

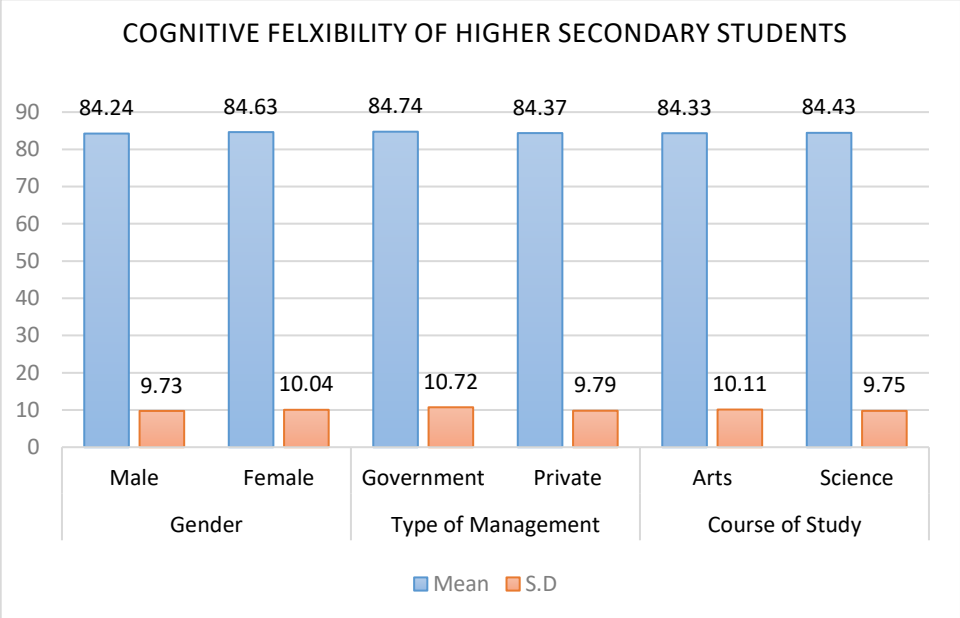

Figure 1: Cognitive flexibility scores of higher secondary students based on gender, type of management and course of study

Hence it is concluded that, Cognitive flexibility of higher secondary students is at average level. And Cognitive flexibility based on the subsamples gender, type of management and course of study is also at average level among higher secondary students.

Hypothesis 2: There is no significant difference between the higher secondary students' Cognitive flexibility based on (a) Gender; (b) Type of Management; and (c) Course of study.

Table 2: Difference between the Means of higher secondary students' Cognitive flexibility

Variable	Sub-Variable	N	Mean	SD	t	Significance
Gender	Male	472	84.24	9.73	0.56	NS
	Female	336	84.63	10.04		
Type of Management	Government	61	84.74	10.72	0.28	NS
	Private	747	84.37	9.79		
Course of Study	Arts	249	84.33	10.11	0.13	NS
	Science	559	84.43	9.75		

From the above table,

a) With respect to higher secondary students' scores of Cognitive flexibility based on gender, the calculated t-value is found to be 0.56 at the 0.05 level which is not significant ($p > 0.05$). Hence, framed hypothesis 2(a) is accepted, and it is inferred that there is no significant difference between male and female higher secondary school students' scores of Cognitive flexibility.
b) With respect to higher secondary students' scores of Cognitive flexibility based on Type of Management, the calculated t-value is found to be 0.28 at the 0.05 level which is not significant ($p > 0.05$). Hence, framed hypothesis 2(b) is accepted, and it is inferred that there is no significant difference between Government and Private higher secondary school students' scores of Cognitive flexibility
c) With respect to higher secondary students' scores of Cognitive flexibility based on Course of Study, the calculated t-value is found to be 0.13 at the 0.05 level which is not significant ($p > 0.05$). Hence, framed hypothesis 2(c) is accepted, and it is inferred that there is no significant difference between Arts and Science higher secondary school students' scores of Cognitive flexibility.

Hypothesis 3: The higher secondary students' Academic achievement is low.

Table 3: Descriptive analysis of Academic achievement scores of higher secondary students

Variable	Sub-Variable	N	Mean	SD
Gender	Male	472	73.92	11.99
	Female	336	73.33	10.05
Type of Management	Government	61	64.41	14.31
	Private	747	74.43	10.59
Course of Study	Arts	249	72.94	9.39
	Science	559	74.00	11.94
	Total	**808**	**73.68**	**11.22**

The above table shows the mean and standard deviation of higher secondary school students' Academic achievement scores with respect to the sub-samples. Higher secondary school students' Academic achievement mean scores are at average level (Low <62, Average 62-85, and High >85) and it range from 73.92 to 74.91 out of maximum of 100.

Hence from the above table, it is inferred that Academic achievement of higher secondary school students is at average level. While observing the mean scores of higher secondary students based on the subsamples gender, type of management and course of study, is also average.

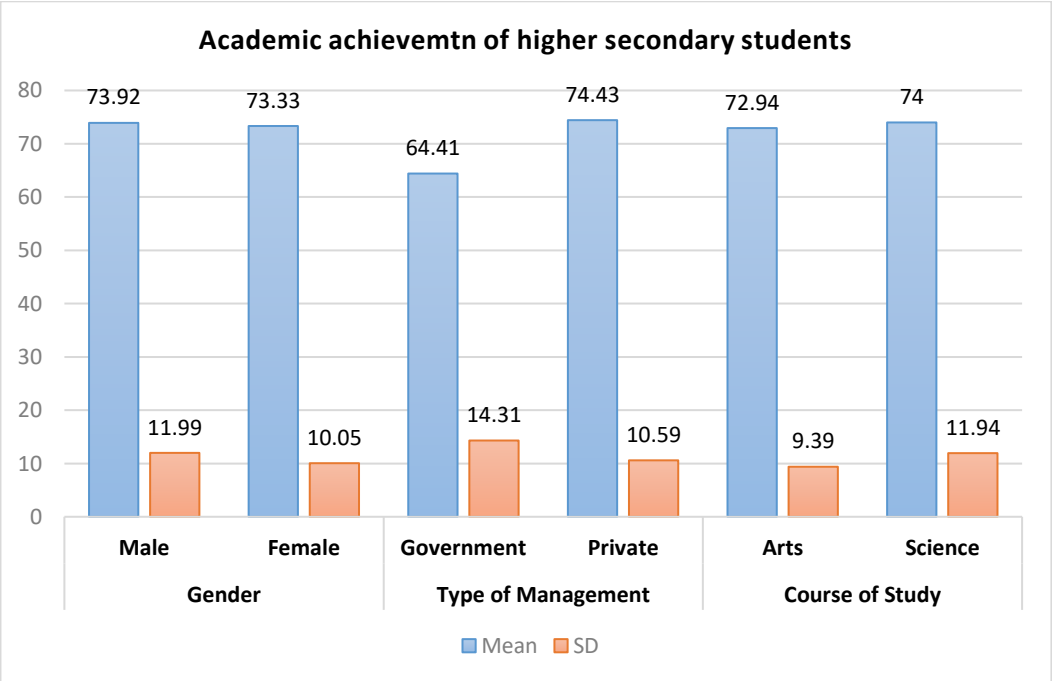

Figure 2: Academic Achievement scores of higher secondary students based on gender, type of management and course of study

Hypothesis 4: There is no significant difference in Academic achievement between the higher secondary students based on the demographic variables of the study.

Table 4: Difference between the Means of higher secondary students' Academic achievement

Variable	Sub-Variable	N	Mean	SD	t	Significance
Gender	Male	472	73.92	11.99	0.74	NS
	Female	336	73.33	10.05		
Type of Management	Government	61	64.41	14.31	6.89	S
	Private	747	74.43	10.59		
Course of Study	Arts	249	72.94	9.39	1.24	NS
	Science	559	74.00	11.94		

From the above table,

i. With respect to higher secondary students' Scores of Academic achievement based on gender, the calculated t-value is found to be 0.74 at the 0.05 level which is not significant ($p > 0.05$). Hence, framed hypothesis 4(a) is accepted, and it is inferred that there is no significant difference between male and female higher secondary school students' scores of Academic achievement.
ii. With respect to higher secondary students' Scores of Academic achievement based on Type of Management, the calculated t-value is found to be 6.89 at the 0.05 level which is not significant ($p < 0.05$). Hence, framed hypothesis 4(b) is rejected, and it is inferred that there is a significant difference between Government and Private higher secondary school students' scores of Academic achievement.
iii. With respect to higher secondary students' Scores of Academic achievement based on Course of Study, the calculated t-value is found to be 1.24 at the 0.05 level which is not significant ($p > 0.05$). Hence, framed hypothesis 4(c) is accepted, and it is inferred that there is no significant difference between Arts and Science higher secondary school students' scores of Academic achievement.

Hypothesis 5: There is no significant relationship between Cognitive flexibility and Academic achievement.

Table 5: Co-efficient of correlation between Cognitive flexibility and Academic achievement.

Variable	N	r	sig	Level
Cognitive flexibility & Academic achievement	808	0.350**	<.001	significant
	**Correlation is significant at the 0.01 level (2-tailed).			

The above table shows that the Pearson product moment correlation is found to be 0.350 at a 0.01 significance level for the entire sample of Academic achievement and Cognitive flexibility of Higher secondary students. This value indicates that there is a significant relationship between students' Cognitive flexibility and Academic achievement of Higher secondary students scores ($p<0.01$). Hence, framed hypothesis 5 is rejected, and it is concluded that there is a significant and positive relationship between Cognitive flexibility and Academic achievement of higher secondary students.

Findings of the study

- Cognitive flexibility of higher secondary students is at average level.
- Cognitive flexibility based on the subsamples gender, type of management and course of study is also at average level among higher secondary students.
- Academic achievement of higher secondary students is at average level.
- Academic achievement based on the subsamples gender, type of management and course of study is also at average level among higher secondary students.
- There is no significant difference between male and female higher secondary school students' scores of Cognitive flexibility.
- There is no significant difference between Government and Private higher secondary school students' scores of Cognitive flexibility
- There is no significant difference between Arts and Science higher secondary school students' scores of Cognitive flexibility.
- There is no significant difference between male and female higher secondary school students' scores of Academic achievement.

- There is a significant difference between Government and Private higher secondary school students' scores of Academic achievement.
- There is no significant difference between Arts and Science higher secondary school students' scores of Academic achievement.
- There is a significant and positive relationship between Cognitive flexibility and Academic achievement of higher secondary students.

Conclusion

This study aimed to study the Cognitive flexibility and Academic achievement of higher secondary students it was found that Cognitive flexibility and academic achievement. Research shows that mindfulness meditation can improve cognitive flexibility, and concentration. And also activities that involve learning new skills or problem solving can help improve cognitive flexibility. Developing emotional intelligence among higher secondary student will also help to improve cognitive flexibility. In this fast technologically oven era, students' cognitive flexibility of students should be focused by the stakeholders to improve their academic achievement and mindfulness. It is suggested to the future researchers to study the relatively influencing factors of cognitive flexibility to improve the academic achievement of higher secondary students.

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