

*CHAPTER IV*

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### **APPLICATION OF FUZZY COGNITIVE BIMAPS IN THE ANALYSIS OF FACTORS INFLUENCING THE ACADEMIC PERFORMANCE OF HIGHER SECONDARY STUDENTS**

#### **Introduction**

A study has been made to analyze the factors influencing the academic performance of higher secondary students using the concept of fuzzy cognitive bimaps. High score in higher secondary examination is the primary task of every student in Tamil Nadu who aspires to gain entry into a professional course of his / her choice. The importance of high score in higher secondary examination gained much significance especially after lifting the common entrance test for professional courses in Tamil Nadu. At this juncture, a research has been conducted to study the factors influencing higher academic performance of higher secondary students and inferences were drawn using fuzzy cognitive bimaps.

#### **Application Of Fuzzy Cognitive Bimaps**

To analyse factors influencing the higher academic performance of higher secondary students, opinion of two groups of respondents were collected. The first group consists of fifty high performers who are pursuing professional courses in leading professional colleges. The second group consists of fifty academicians handling higher secondary subjects.

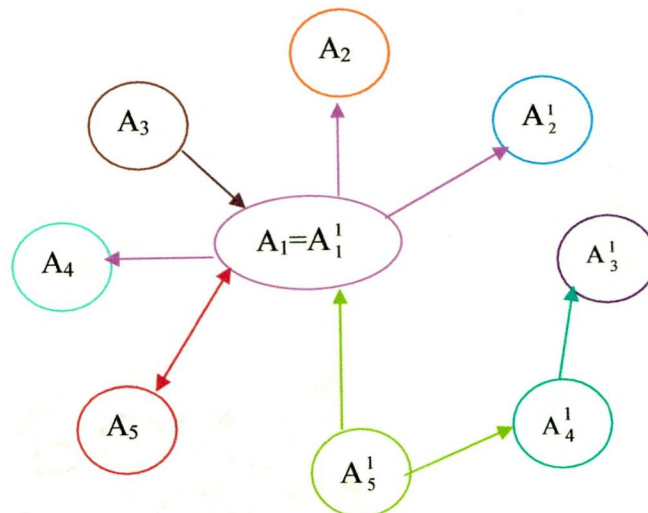
Majority of the respondents of the first group identified the following factors:

- $A_1$  - Special coaching imparted by tuition centres
- $A_2$  - Concentration on studies
- $A_3$  - Better motivation
- $A_4$  - Planned preparation
- $A_5$  - Proper guidance and counseling

Majority of the respondents of the second group identified the following factors:

- $A_1^1$  - Special coaching imparted by tuition centres
- $A_2^1$  - Exposure to the scoring techniques
- $A_3^1$  - Regularity in writing tests and exams
- $A_4^1$  - Maintaining good health
- $A_5^1$  - Good economic condition and good environment at home

Based on the opinion given by the majority of respondents in each group, the following Fuzzy Cognitive Bimap is framed.



Now the associated connection bimatrix is given by  $B = B_1 \cup B_2$ .

$$= \begin{matrix} & A_1 & A_2 & A_3 & A_4 & A_5 \\ \begin{matrix} A_1 \\ A_2 \\ A_3 \\ A_4 \\ A_5 \end{matrix} & \begin{bmatrix} 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \end{bmatrix} & \cup & \begin{matrix} A_1^1 & A_2^1 & A_3^1 & A_4^1 & A_5^1 \\ \begin{matrix} A_1^1 \\ A_2^1 \\ A_3^1 \\ A_4^1 \\ A_5^1 \end{matrix} & \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 \end{bmatrix} \end{matrix}$$

Here, we preferred to study only the effect of the factor **Special Coaching Imparted by Tuition Centres** on the other factors identified by both the groups.

For this purpose, we study the effect of the state bivector

$X = X_1 \cup X_2 = (1\ 0\ 0\ 0\ 0) \cup (1\ 0\ 0\ 0\ 0)$  on the dynamical bisystem  $B = B_1 \cup B_2$ .

The effect of  $X$  on  $B$  is given by

$$\begin{aligned} XB &= X(B_1 \cup B_2) \\ &= X_1 B_1 \cup X_2 B_2 \\ &= (0\ 1\ 0\ 1\ 1) \cup (0\ 1\ 0\ 0\ 0) \end{aligned}$$

after updating and thresholding we get

$$\begin{aligned} Y &= (1\ 1\ 0\ 1\ 1) \cup (1\ 1\ 0\ 0\ 0) \\ &= Y_1 \cup Y_2. \end{aligned}$$

The effect of  $Y$  on  $B$  is given by

$$\begin{aligned} YB &= Y_1 B_1 \cup Y_2 B_2 \\ &= (1\ 1\ 0\ 1\ 1) \cup (0\ 1\ 0\ 0\ 0). \end{aligned}$$

After updating and thresholding we get the resultant vector as

$$Z = (1\ 1\ 0\ 1\ 1) \cup (1\ 1\ 0\ 0\ 0)$$

which is a fixed bipoint.

## **Conclusion**

According to the first group, Special Coaching imparted by tuition centres has no impact on Better Motivation. However it has influence on Concentration on studies, Planned preparation and Proper guidance and counseling. According to the second group, Special Coaching imparted by tuition centres has impact only on the Exposure to the scoring techniques and nothing to do with Regularity in writing tests and exams or Maintaining good health or Good economic conditions and good environment at home.