Analysis of the Depression, Stress and Anxiety Experienced by the Plus two Students Studying in City Schools of Chennai Using NASFCMs Model

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Abstract

In this paper we study the stress experienced by the plus two students studying in city schools opting for science stream is analysed using New Average Simple Fuzzy Cognitive Maps (NAFCMs) model.

Key words: Fuzzy Cognitive Maps (FCMs) model, Hidden point, Fixed Point, New Average Simple Fuzzy Cognitive Maps (NAFCMs) model.

1 Introduction

This paper is organized into three sections. Section one is introductory in nature. Section two introduces the concepts/nodes used in the construction of the new models. In section three the new NASFCMs model is used to analyse the problem.

Now a brief description of the problem and justification for using the newly constructed model to analyse the stress and anxiety levels felt by the students due to their parents, continuous tuition classes and comparison of their performance with others and so on. This also has a strong impact on their physical and mental health.

Fuzzy Cognitive Maps (FCMs) models

happens to be a very powerful mathematical tool when the problem in hand is packed with feelings like anxiety, depression, stress etc. so at the outset one is justified in using FCMs.

2 Brief Description of the Problem and Justification for Using the FCMs Model to Study the Problem :

This study deals about the peer pressure faced by plus two school students studying in Chennai city schools. The impact of peer pressure due to tuitions, tests, homework, daily activities of the students and above all its impact on their general health is studied and analysed[1-5].

At the outset it is justified that using FCMs model, for in the first place most of

attributes related with this problem cannot be measured by numbers so basically the data under analysis is an unsupervised one. Further only this model can give the hidden pattern of the problem.

The data collected from students, parents, teachers, educationalist and others by interviewing/discussing with them are used in this study. The study is restricted to only students studying plus two in Chennai city schools. Further the study is restricted to plus two students studying in science stream and the depression they undergo due to pressing of parents and teachers to get high ranks and top marks[6-9].

The set of attributes given by the experts is enlisted and each of them is briefly described in the following:

C_1 - Parents wishes or Parents desire: Parents crush and control all the activities of their children as they wish to make them either doctor or engineer and focus only on their wishes.

C_2 - Focus on many tuitions: Several tuitions after and before school hours are given to them by professionals round the clock in all subjects to achieve C_1.

C_3 - Teachers stress: Teachers press them with repeated test in the name of surprise test, weekly test, monthly test, revision test, etc. to make them get cent percent result.

C_4 - Friends stress: Pressure from classmates to get good marks. Students compare their performance with senior students and their own classmates or form children studying smaller classes. So, they need to achieve cent percent results to get the name that they are better than their seniors. (This sort of attitude is forced upon them by their parents).

C_5 - Role Model: Only students who are top rank holders and school toppers are taken as role models and specially they compare their marks and grades of their wards. These role models are also chosen by parents for them.

C_6 - No time to play or relax: The students cannot participate in any extracurricular activities. They are unable to express their feelings as they fear their parents and want to show the society they are good children; so they are under constant stress. Hence no time to play or get any form of relaxation or watch TV.

C_7 - Cause of extreme stress: Parents and teachers compare their marks and other activities with other students, relatives and neighbours. So they become stressed as they are in the sensitive adolescent's age. They are very much scared to get degraded, in front of others. They are worried about getting ill-treated by parents, relatives and neighbours.

C_8 - No proper sleep: They are sleep deprived, due to heavy stress and workload.

Here all the experts use the eight attributes described above to study the problem using FCMs model which will be used in the construction off the NASFCMs model.

For this the experts opinion from a parent is taken. The directed graph and the connection matrix of the first expert (parent) is as follows.

Let G_1 given in Figure 2.1, be the
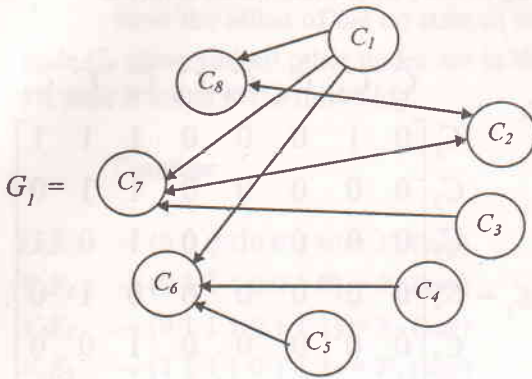
directed graph given by the first expert.

$$G_1 =$$

Figure 2.1

Connection matrix E_1 of the directed graph G_1 which forms the dynamical system of the model is as follows;

$$
E_1 = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array}
\begin{array}{c} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \end{array} \\
\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix} \end{array}
$$

Let

$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$, $C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$,
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$, $C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$,
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$, $C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$,
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$ and $C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$

be the initial state vectors.

Now the expert proceeds onto work with few of the initial state vectors from C_i; $i = 1, 2, …, 8$.

$C_1E_1 \rightarrow (1\ 0\ 0\ 0\ 0\ 1\ 1\ 1) = X_1$ (say)
$X_1E_1 \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 1\ 1) = X_2$
$X_2E_1 \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 1\ 1) = X_3\ (= X_2)$.

The hidden pattern is a fixed point. Clearly parents stress has strong impact on focus on many tuitions forced on them C_2. Further parents stress make the node C_6 'on' which says the children have no time to relax and play, the on state of C_7 implies they are under extreme stress because of their parents. All these lead to sleeplessness as the node C_8 is in the on state[3-7].

Next the expert works with the on state on the node C_3 only and all other nodes are in the off state.

The effect of C_3 on the dynamical system E_1 is given by

$C_3E_1 \rightarrow (0\ 0\ 1\ 0\ 0\ 0\ 1\ 0) = S_1$ (say)
$S_1E_1 \rightarrow (0\ 1\ 1\ 0\ 0\ 0\ 1\ 1) = S_2$
$S_2E_1 \rightarrow (0\ 1\ 1\ 0\ 0\ 0\ 1\ 1) = S_3$
$S_3E_1 \rightarrow (0\ 1\ 1\ 0\ 0\ 0\ 1\ 1) = S_4\ (= S_3)$.

Thus the hidden pattern is fixed point so the on state of the node teachers stress makes the nodes C_2, C_7 and C_8 to on state which implies the students are troubled because of so many tuitions and they are under extreme stress leading to sleeplessness[2-5].

Next the expert proceeds onto work with the node C_8 alone in the on state and all other are in the off state. The effect of the

node C_8 on E_1 is as follows

$C_8E_1 \rightarrow (0\ 1\ 0\ 0\ 0\ 0\ 0\ 1) = T_1$

$T_1E_1 \rightarrow (0\ 1\ 0\ 0\ 0\ 0\ 1\ 1) = T_2$

$T_2E_1 \rightarrow (0\ 1\ 0\ 0\ 0\ 0\ 1\ 1) = T_3 (= T_2)$.

Thus the hidden pattern is a fixed point. Sleeplessness due to continuous tuitions and extreme stress and tensions. In this paper the experts opinion is found with each of the initial state vectors using the dynamical system E_1 and is enlisted in Table 2.1.

Table 2.1: Table of Hidden Patterns given by the First Expert E_1

Initial State vector	Hidden patterns of C_i
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 0\ 0\ 0\ 1\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(0\ 1\ 0\ 0\ 0\ 0\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(0\ 1\ 1\ 0\ 0\ 0\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(0\ 0\ 0\ 1\ 0\ 1\ 0\ 0)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(0\ 0\ 0\ 0\ 1\ 1\ 0\ 0)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(0\ 1\ 0\ 0\ 0\ 0\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(0\ 1\ 0\ 0\ 0\ 0\ 1\ 1)$

Next the opinion of the second expert is obtained. The second expert who is a grandparent has given the following directed graph G_2 illustrated in Figure 2.2.
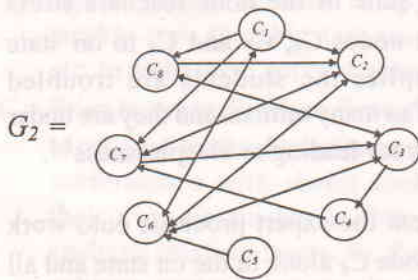
$G_2 =$

Figure 2.2

The connection matrix E_2 of the directed graph G_2 of the FCMs model is as follows.

$$E_2 = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{c} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \end{array} \\ \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{array}.$$

Now the effect of the on state of the initial state vectors C_2, C_4 and C_6 using the dynamical system E_2 is found in the following.

Consider $C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$ to find the effect of C_2 on E_2.

$C_2E_2 \rightarrow (0\ 1\ 0\ 0\ 0\ 1\ 1\ 0) = P_1$ (say)

$P_1E_2 \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = P_2$ (say)

$P_2E_2 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = P_3$

$P_3E_2 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = P_4 (= P_3)$.

Thus the hidden pattern is a fixed point[6-9]. Clearly it is seen the series of tuitions imposed in these children makes C_1, C_3, C_4, C_6, C_7 and C_8 to the on state. Thus the tuitions imposed on the children makes sure the parents desire to make them professionals, teachers also stress them, friends stress them they have no time to relax and they suffer from improper sleep. Only the node role of role models does

not come to on state.

Next the effect of the on state of the node C_4 alone and all other nodes are in the off state is found in the following.

Consider

$C_4E_2 \rightarrow (0\ 0\ 0\ 1\ 0\ 0\ 1\ 0) = V_1$ (say)
$V_1E_2 \rightarrow (0\ 1\ 1\ 1\ 0\ 0\ 1\ 0) = V_2$ (say)
$V_2E_2 \rightarrow (0\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = V_3$ (say)
$V_3E_2 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = V_4$ (say)
$V_4E_2 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = V_5\ (= V_4)$.

The hidden pattern is a fixed point all nodes come to on state except the node C_5.

The attribute friend stress C_4, who insult them for not getting good marks and that compared by parents makes on all the nodes C_1, C_2, C_3, C_6, C_7 and C_8 to on state. Thus these nodes are very strongly inter related.

Now the expert proceeds on to work with node C_6 alone in the on state and all other nodes are in the off state.

The effect of C_6 on the dynamical system E_2 is as follows:

$C_6E_2 \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 0\ 0) = R_1$ (say)
$R_1E_2 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = R_2$ (say)
$R_2E_2 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = R_3\ (= R_2)$.

Thus the hidden pattern is a fixed point which has made all nodes to on state except the node C_5 the role of the role models. All the nodes come to on state once again proving

the strong impact of one node over the other.

Here all the eight nodes impact on the dynamical system E_2 is found and tabulate then in the following Table 2.2.

Table 2.2 Table of Hidden patterns given by the Second expert

Initial State vector	Hidden patterns of C_i
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$

The third expert who is a teacher has given the following directed graph G_3.

$G_3 =$

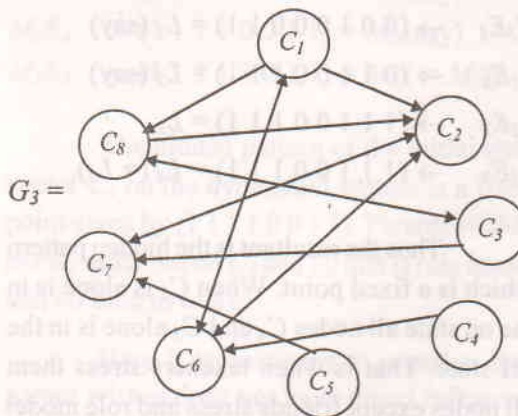Figure 2.3

The connection matrix E_3 of the directed graph which forms the dynamical system of the FCMs model is as follows;

$$E_3 = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \\ \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{array}.$$

Now the expert proceeds to work with the on state of the nodes C_3, C_4 and C_7 using the dynamical system E_3.

Let $C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$ be the initial state vector. To find the effect of C_3 on E_3.

$C_3E_3 \rightarrow (0\ 0\ 1\ 0\ 0\ 0\ 1\ 1) = L_1$ (say)

$L_1E_3 \rightarrow (0\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = L_2$ (say)

$L_2E_2 \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = L_3$

$L_3E_3 \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = L_4 (= L_3)$.

Thus the resultant is the hidden pattern which is a fixed point. When C_3 is alone is in the on state all nodes C_4 and C_5 alone is in the off state. That is when teachers stress them all nodes except friends stress and role model come to on state[1-9].

The expert proceeds on to work with the on state of the node C_4 on the dynamical system E_3.

$C_4E_3 \rightarrow (0\ 0\ 0\ 1\ 0\ 1\ 0\ 0) = B_1$

$B_1E_3 \rightarrow (1\ 1\ 0\ 1\ 0\ 1\ 0\ 0) = B_2$

$B_2E_3 \rightarrow (1\ 1\ 0\ 1\ 0\ 1\ 1\ 1) = B_3$

$B_3E_3 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = B_4$

$B_4E_3 \rightarrow (1\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = B_5(= B_4)$.

Thus the hidden pattern associated with the initial state vector C_4 is a fixed point given by B_4. When C_4 is in the on state only the node C_5 is in the off state and all other nodes come to on state[3-7].

Next the expert finds the effect of the node $C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$ on the dynamical system E_3.

$C_7E_3 \rightarrow (0\ 1\ 0\ 0\ 0\ 0\ 1\ 0) = D_1$ (say)

$D_1E_3 \rightarrow (0\ 1\ 0\ 0\ 0\ 1\ 1\ 0) = D_2$ (say)

$D_2E_3 \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 1\ 0) = D_3$ (say)

$D_3E_3 \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 1\ 1) = D_4$ (say)

$D_4E_3 \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = D_5$ (say)

$D_5E_3 \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = D_6 (= D_5)$.

The hidden pattern of the initial state vector C_7 is $(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$. Only the nodes C_4 and C_5 does not come to on state when the node children are undergo extreme stress due to over load of work.

Now the effect of each and every state vectors C_1, C_2, ..., C_8 is worked out and tabulated in the Table 2.3 which is as follows:

Table 2.3: Table of Hidden patterns given
by the Third Expert

Initial State vector	Hidden patterns of C_i
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(1\ 1\ 1\ 0\ 1\ 1\ 1\ 1)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$

The fourth expert's opinion who is a student has given the following directed graph G_4 which is illustrated in Figure 2.4.
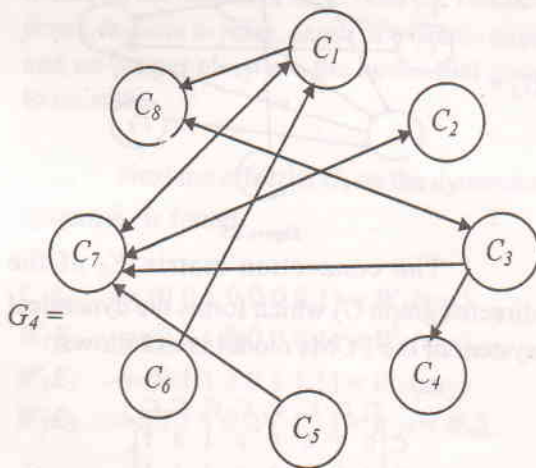

$$G_4 =$$

Figure 2.4

The connection matrix E_4 of the directed graph which forms the dynamical system of the FCMs model is as follows.

$$E_4 = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{c} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \end{array} \\ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{array}.$$

Now the effect of the initial state vector C_1, C_5 and C_8 are found in the following. The effect of C_1 on the dynamical E_4 in as follows:

$C_1E_4 \rightarrow (1\ 0\ 0\ 0\ 0\ 0\ 1\ 1) = M_1$ (say)
$M_1E_4 \rightarrow (1\ 1\ 1\ 0\ 0\ 0\ 1\ 1) = M_2$ (say)
$M_2E_4 \rightarrow (1\ 1\ 1\ 1\ 0\ 0\ 1\ 1) = M_3$ (say)
$M_3E_4 \rightarrow (1\ 1\ 1\ 1\ 0\ 0\ 1\ 1) = M_4 (= M_3)$.

The hidden pattern of the initial state vector C_1 on the dynamical system is a fixed point given by $(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$. Parents wishes has no influence on C_5 and C_6 that is role model and no time to relax.

Here it is pertinent to mention that parent wishes does not have direct influence on no time to relax and role of role model. For if (parents) they wish and not seek for constant tuition and comparison with others it will give them time to relax but on the contrary they forcefully send them to tuitions and so on alone gives them no time to relax.

The effect of C_5 on the dynamical system E_4 is found in the following:

$$C_5E_4 \rightarrow (0\ 0\ 0\ 0\ 1\ 0\ 1\ 0) = V_1 \text{(say)}$$
$$V_1E_4 \rightarrow (1\ 1\ 0\ 0\ 1\ 0\ 1\ 0) = V_2 \text{(say)}$$
$$V_2E_4 \rightarrow (1\ 1\ 0\ 0\ 1\ 0\ 1\ 1) = V_3 \text{(say)}$$
$$V_3E_4 \rightarrow (1\ 1\ 1\ 0\ 1\ 0\ 1\ 1) = V_4 \text{(say)}$$
$$V_4E_4 \rightarrow (1\ 1\ 1\ 1\ 1\ 0\ 1\ 1) = V_5 \text{(say)}$$
$$V_5E_4 \rightarrow (1\ 1\ 1\ 1\ 1\ 0\ 1\ 1) = V_6(=V_5).$$

The hidden pattern is a fixed point only the node C_6 is in the off state that is no time to relax and play in the off state that is role model has no relation to no time to relax. However since the role model is clearly imposed by parents and teachers on their children the nodes focus on tuitions, teachers stress, friends stress cause of extreme stress and sleeplessness come to on state.

Now the effect of the node C_8 on the dynamical system E_4 is as follows:

$$C_8E_4 \rightarrow (0\ 0\ 1\ 0\ 0\ 0\ 0\ 1) = Q_1 \text{(say)}$$
$$Q_1E_4 \rightarrow (0\ 0\ 1\ 1\ 0\ 0\ 1\ 1) = Q_2 \text{(say)}$$
$$Q_2E_4 \rightarrow (1\ 1\ 1\ 1\ 0\ 0\ 1\ 1) = Q_3 \text{(say)}$$
$$Q_3E_4 \rightarrow (1\ 1\ 1\ 1\ 0\ 0\ 1\ 1) = Q_4(=Q_3).$$

Thus the hidden pattern is again a fixed point given by Q_3. Sleeplessness has no effect on C_5 and C_6 that is no time to play or relax and role of role model. The effect of all the nodes $C_1, C_2, ..., C_8$ on the dynamical system E_4 is calculated.

Using each C_i as the initial state vector the resultant state vector for $1 \leq i \leq 8$, found and it is enlisted in the following Table 2.4.

Table 2.4: Table of Hidden patterns given by the Fourth Expert

Initial State vector	Hidden patterns of C_i
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 1\ 0\ 1\ 1)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$

Next the opinion of the fifth expert is given. An educationalist has given the following directed graph G_5 who is the fifth expert in the following Figure 2.5.
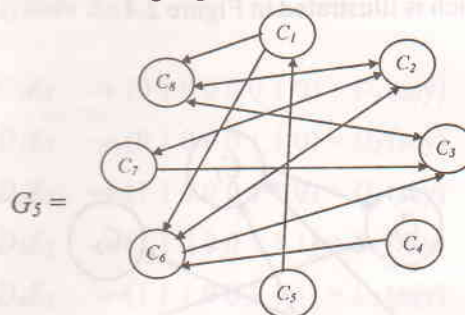

Figure 2.5

The connection matrix E_5 of the directed graph G_5 which forms the dynamical system of the FCMs model is as follows;

$$E_5 = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \overset{\displaystyle C_1\ C_2\ C_3\ C_4\ C_5\ C_6\ C_7\ C_8}{\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}}.$$

Here $C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$, $C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$, $C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$, $C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$, $C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$, $C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$, $C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$ and $C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$ be the initial state vectors.

The effect of the initial state vector C_2, C_3 and C_4 using the dynamical system E_5 is found in the following.

The effect of the initial state vector C_2 in the dynamical system E_5 is as follows.

$C_2E_5 \rightarrow (0\ 1\ 0\ 0\ 0\ 1\ 1\ 1) = N_1$ (say)

$N_1E_5 \rightarrow (0\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = N_2$ (say)

$N_2E_5 \rightarrow (0\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = N_3 (= N_2)$.

The hidden pattern is a fixed point the continuous tuition classes imposed on them makes on the nodes C_3, C_6, C_7 and C_8. Teachers stress, no time to relax, cause of extreme stress and no proper sleep are the nodes that come to on state.

Next the effect of C_3 on the dynamical system E_5 is found.

$C_3E_5 \rightarrow (0\ 0\ 1\ 0\ 0\ 0\ 0\ 1) = W_1$ (say)

$W_1E_5 \rightarrow (0\ 1\ 1\ 0\ 0\ 0\ 0\ 1) = W_2$ (say)

$W_2E_5 \rightarrow (0\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = W_3$ (say)

$W_3E_5 \rightarrow (0\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = W_4 (= W_3)$.

The hidden pattern of the initial state vector C_3 is given by W_4. The on state of teachers stress makes on the nodes C_2, C_6, C_7 and C_8. Teachers stress can affect continuous tuitions C_2, No time to play or relax C_6

they are under extreme stress C_7 and have sleepless nights.

Next the hidden pattern of the initial state vector C_4 on the dynamical system E_5 is found in the following:

$C_4E_5 \rightarrow (0\ 0\ 0\ 1\ 0\ 1\ 0\ 0) = Y_1$ (say)

$Y_1E_5 \rightarrow (0\ 1\ 1\ 1\ 0\ 1\ 0\ 0) = Y_2$ (say)

$Y_2E_5 \rightarrow (0\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = Y_3$ (say)

$Y_3E_5 \rightarrow (0\ 1\ 1\ 1\ 0\ 1\ 1\ 1) = Y_4 (= Y_3)$.

Thus the resultant is a fixed point. The on state of the node C_4 has no impact on the nodes C_1 and C_5; for these nodes remain in the off state; that is friends stress is nothing to do about parents imposing the professional course on their children and role model.

Using each C_i as the initial state vector the resultant state vectors for $1 \leq i \leq 8$ is found and it is enlisted in the following given in Table 2.5.

Table 2.5 : Table of Hidden patterns given by the Fifth Expert

Initial State vector	Hidden patterns of C_i
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(0\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 1\ 1\ 1\ 1)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$

From the experts opinion and the resultant vectors of the all the eight experts are very closely dependent on each other.

Finally a consolidated Table 2.6 of the 5 experts is given for comparison.

Table 2.6 : Comparison Table of hidden patterns of all the five experts

Initial State vector	Hidden patterns of C_i Expert E_1	Hidden patterns of C_i Expert E_2
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 0\ 0\ 0\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(0\ 1\ 0\ 0\ 0\ 0\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(0\ 1\ 1\ 0\ 0\ 0\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(0\ 0\ 0\ 1\ 0\ 1\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(0\ 0\ 0\ 0\ 1\ 1\ 0\ 0)$	$(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(0\ 1\ 0\ 0\ 0\ 0\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(0\ 1\ 0\ 0\ 0\ 0\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$

Hidden pattern of C_i Expert E_3	Hidden patterns of C_i Expert E_4	Hidden pattern of C_i Expert E_5
$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$	$(0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(0\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$(1\ 1\ 1\ 1\ 1\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 1\ 0\ 1\ 1)$	$(1\ 1\ 1\ 0\ 1\ 1\ 1\ 1)$
$(1\ 1\ 1\ 0\ 1\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$	$(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)$	$(0\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$

Now from this Table 2.6 it is clear that almost the four agree upon all the resultant vectors. Only the expert one's opinion is different from the other experts.

It is easily seen only the hidden pattern given by parents (the expert) is different from all the other experts. This is justified for parents do not view the imposition of the professional course or forcing them to go to tuition classes or fixing a role model for them or taking away their time; so no time to relax or play as undue stress in their children imposed by them. That is why the difference in the hidden pattern. In the following section analysis of the problem using the newly constructed NASFCMs is carried out.

3 Use of NASFCMs Model to Study the Problem and Conclusions :

  The New Average Simple FCM model[1-2, 6-8] is used using these five experts. All the five connection matrices $E_1, E_2, ..., E_5$ given in section 2 which are the opinion of the five experts are added and it is denoted by E'. The average of it is got by dividing E' by five and is denoted by E^1.

  Let $E' = E_1 + E_2 + E_3 + E_4 + E_5$.

$$E' = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \\ \hline 0 & 2 & 0 & 0 & 0 & 4 & 3 & 5 \\ 0 & 0 & 0 & 0 & 0 & 3 & 5 & 2 \\ 0 & 0 & 0 & 2 & 0 & 1 & 3 & 4 \\ 0 & 0 & 0 & 0 & 0 & 3 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 2 & 2 & 0 \\ 3 & 3 & 2 & 0 & 0 & 0 & 0 & 0 \\ 1 & 5 & 2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 4 & 4 & 0 & 0 & 0 & 0 & 0 \end{array}$$

Now to get the average divide E' by 5. Let $E^1 = E'/5$ that is

$$E^1 = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \\ \hline 0 & 0.4 & 0 & 0 & 0 & 0.8 & 0.6 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0.6 & 1 & 0.4 \\ 0 & 0 & 0 & 0.4 & 0 & 0.2 & 0.6 & 0.8 \\ 0 & 0 & 0 & 0 & 0 & 0.6 & 0.2 & 0 \\ 0.2 & 0 & 0 & 0 & 0 & 0.4 & 0.4 & 0 \\ 0.6 & 0.6 & 0.4 & 0 & 0 & 0 & 0 & 0 \\ 0.2 & 1 & 0.4 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0.8 & 0.8 & 0 & 0 & 0 & 0 & 0 \end{array} = (e_{ij})$$

  Now using the parameter $\alpha = 0.5$, convert E^1 into E. That is in E^1 replace e_{ij} by 1 if $e_{ij} \geq 0.5$ else $e_{ij} = 0$. Hence

$$E = \begin{array}{c} \\ C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \\ C_8 \end{array} \begin{array}{cccccccc} C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \\ \hline 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \end{array}$$

E is defined as the dynamical system of the new NASFCMs or equivalently E is the connection matrix of the NASFCMs.

  First we find the influence of the on state of the nodes C_6, C_7 and C_8 on the NASFCMs dynamical system E.

  The effect of C_6 on E is given by

$C_6E \quad \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 0\ 0) = S_1$ (say)

$S_1E \quad \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 1\ 1) = S_2$ (say)

$S_2E \quad \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = S_3$ (say)

$S_3E \quad \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = S_4 (= S_3)$.

  Thus the hidden pattern of the state vector C_6 is a fixed point given by $S_4 = (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$. Only the nodes friends stress and role of role models influence does not come to on state. Next the on state of the node C_7 using the dynamical system E is calculated in the following:

$C_7E \quad \rightarrow (0\ 1\ 0\ 0\ 0\ 0\ 1\ 0) = Z_1 \text{(say)}$
$Z_1E \quad \rightarrow (0\ 1\ 0\ 0\ 0\ 1\ 1\ 0) = Z_2 \text{(say)}$
$Z_2E \quad \rightarrow (1\ 1\ 0\ 0\ 0\ 1\ 1\ 0) = Z_3 \text{(say)}$
$Z_3E \quad \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = Z_4 \text{(say)}$
$Z_4E \quad \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = Z_5 (= Z_4).$

Thus the hidden pattern is fixed point and this state vector C_7 also has no impact on C_4 and C_5.

Next the effect of C_8 on the dynamical system E is found in the following:

$C_8E \quad \rightarrow (0\ 1\ 1\ 0\ 0\ 0\ 0\ 1) = B_1 \text{(say)}$
$B_1E \quad \rightarrow (0\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = B_2 \text{(say)}$
$B_2E \quad \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = B_3 \text{(say)}$
$B_3E \quad \rightarrow (1\ 1\ 1\ 0\ 0\ 1\ 1\ 1) = B_4 (= B_3).$

Thus the hidden pattern is a fixed point the node C_8 has no influence on C_4 and C_5. For the 8 nodes $C_1, C_2, ..., C_8$ the hidden patterns are calculated and is tabulated in the following Table 3.1.

Table 3.1: Table of Hidden patterns given by the first expert

Initial State vector	Hidden patterns of C_i
$C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_2 = (0\ 1\ 0\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_3 = (0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_4 = (0\ 0\ 0\ 1\ 0\ 0\ 0\ 0)$	$(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$
$C_5 = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$	$(0\ 0\ 0\ 0\ 1\ 0\ 0\ 0)$
$C_6 = (0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_7 = (0\ 0\ 0\ 0\ 0\ 0\ 1\ 0)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$C_8 = (0\ 0\ 0\ 0\ 0\ 0\ 0\ 1)$	$(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$

The eight hidden patterns of the five experts $E_1, E_2, ..., E_5$ given by Table 2.6 of Section 2 and the second column of Table 3.1 is tabulated in the following Table 3.2.

Now using the Table 2.6 the first row elements barring $(1\ 0\ ...\ 0)$ are added and divided by 5. The same α used to threshold the NASFCMs matrix is used to threshold the average of the first row elements. This procedure is repeated for all rows. This is illustrated for a few entries in the following. For the initial state vector $C_1 = (1\ 0\ 0\ ...\ 0)$ the entries in row one and columns 2, 3, 4, 5 and 6 are added this is

$(1\ 1\ 0\ 0\ 0\ 1\ 1\ 1)+(1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)+(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$+(1\ 1\ 1\ 1\ 0\ 0\ 1\ 1)+(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$
$=(5\ 5\ 4\ 2\ 0\ 4\ 5\ 5)=B\text{(say)}.$

Divide B by 5 so that

$B/5 = (1\ 1\ 1 0.8\ 0.4\ 0\ 0.8\ 1\ 1).$

Using $\alpha = 0.5$, $B/5$ is thresholded as $(1\ 1\ 1\ 0\ 0\ 1\ 1\ 1)$ that is if the entry in $B/5$ is greater than or equal to 0.5 put 1 else put 0.

Likewise using row 2 the columns 2, 3, 4, 5 and 6 are added by the procedure mentioned above is carried out. Such working is done for all rows 3, 4 etc and the 7th column of the Table 2.6 is got and is represented as Table 3.2.

Table 3.2: Hidden patterns of the experts and their Average

On state node	Hidden pattern given by the Experts					Average of all Experts X
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	
C_1	11000111	11110111	11100111	11110011	11100111	11100111
C_2	01000011	11110111	11100111	11110011	01100111	11100111
C_3	01100011	11110111	11100111	11110011	01100111	11100111
C_4	00010100	11110111	11110111	00010000	01110111	01110111
C_5	00001100	11111111	11101111	11111011	11101111	11101111
C_6	00000100	11110111	11100111	11110111	01100111	11100111
C_7	01000011	11110111	11100111	11110011	01100111	11100111
C_8	01000011	11110111	11100111	11110011	01100111	11100111

From this table there is not much of difference between the X_i's for each of the C_i's $1 \le i \le 8$. However only the expert one is different not only from all expert but also from the last column which is the average of all experts hidden patterns. The reason for it is given earlier, that is the perspective with which the parents view the problem is entirely different from others.

Next the comparison table of the hidden patterns Y given by the NASFCMs model from Table 3.1 and the last column X given in Table 3.2 is tabulated in Table 3.3.

From Table 3.3 the comparison given in of X and Y can be got. X the real average taken from the hidden patterns of 5 experts relating to the respective hidden patterns C_1, ..., C_8 respectively and Y the hidden pattern of $C_1, C_2, ..., C_8$ using NASFCMs model can be compared.

Table 3.3: Hidden patterns of the NASFCMs and the average of all the five experts' hidden pattern

Initial state	X	Y
$C_1 = (10000000)$	11100111	11100111
$C_2 = (01000000)$	11100111	11100111
$C_3 = (00100000)$	11100111	11110111
$C_4 = (00010000)$	01110111	11110111
$C_5 = (00001000)$	11101111	00001000
$C_6 = (00000100)$	11100111	11100111
$C_7 = (00000010)$	11100111	11100111
$C_8 = (00000001)$	11100111	11100111

In case of the initial state vectors C_1, C_2, C_6, C_7 and C_8 both X and Y are the same. In case of C_3, C_4 and C_5 we see there is difference. Infact the difference in C_3 and C_4 is negligible. However in case C_5 the difference is great which implies there is no impact on the node role models in this study.

The node role model C_5 has no impact in the systems given by all the 5 experts more

so by the NASFCMs. But working with the new NASFCM the resultant state vector of four and five are perfectly consistent in all the eight resultant state vectors. This NASFCM gives the consistent prediction of the consolidated or integrated result, whereas the average of the five vectors namely column X behaves in the inconsistent way for the ON state of the nodes four and five.

Thus by using this NASFCM both time and economy can be saved without sacrificing the opinion of each and every expert seen from the tables. Finally NASFCM model is better than taking average as seen from Table 3.2 and 3.3.

From the study all the six FCMs models gave only fixed points as hidden patterns which clearly proves these factors do not change for this given period. Further the study proves all the nodes are very closely entangled seen from Tables 3.2 and 3.3. Hence the present generation students especially adolescents face several problems from within high school and family. The pressures from parents, teacher's, friends and relatives depress them beyond repair which result even in health problems like B.P, diabetes, sleeplessness and all stress related health problems which is due to no time to play or relax and be themselves.

References

1. Kosko, B. Fuzzy Cognitive Maps, *Int. J. of Man-Machine Studies*, *24*, 65-75 (1986).

2. Kosko, B., *Neural Networks and Fuzzy Systems: A Dynamical Systems Approach to Machine Intelligence*, Prentice Hall of India (1997).

3. Mohamedayupkhan, M., and Mani, S., *A study on higher secondary students personal problems, study involvement and academic achievement*, International Journal of Science and Research, Vol. 3, no 5, pp, 876-882 (2014).

4. Nair, M. K. C, Paul, M. K., & John, R. (2004). Prevalence of depression in adolescents. *Indian Journal of Pediatrics, 71*, 523-524.

5. Rao, AS. *Academic stress and adolescent distress: The experiences of 12th standard students in Chennai, India.* ProQuest, (2008).

6. Vasantha Kandasamy, W.B., and Smarandache, F., *Fuzzy Cognitive Maps and Neutrosophic Cognitive Maps*, Xiquan, Phoenix, (2005).

7. Vasantha Kandasamy, W.B., Smarandache, F. and Ilanthenral, K., *New techniques to analysis the prediction in Fuzzy models*, The Educational Publisher, Ohio, (2014).

8. Vasantha Kandasamy, W.B., Florentin Smarandache and K: Kandasamy, *Fuzzy and Neutrosophic Analysis of Periyar's Views on Untouchability*, Hexis, Arizona, (2005).

9. Zadeh, L. Fuzzy set, *Information and control, 8*, 338-353 (1965).