Rural-Urban Fringe Students Towards Learning English using Nonagonal Fuzzy Cognitive Maps

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Abstract: ***Motivation and aptitude are essential components of teaching-learning process. The objective of this study is to identify the factors that affect the intrinsic and extrinsic motivation of Rural-Urban Fringe (R-U Fringe) students of Chennai, India towards learning English. This also focuses to find which of those factors influence both the motivation in large. A study has been conducted among 160 learners of Chennai through a questionnaire. The data was analyzed through Nonagonal fuzzy number modeling. And it is found the factors that influence the intrinsic motivation of the R-U Fringe learners from high to low are challenge, fantasy, control, curiosity, cooperation, recognition and competition.***

Index Terms: intrinsic motivation factor Nonagonal fuzzy number, Rural-Urban Fringe, Challenge, Curiosity, Control, Recognition, cooperation, competition and fantasy.

I. INTRODUCTION

Motivation and aptitude play a vital role in learning English as a second language. There are two types of motivations, intrinsic and extrinsic. While intrinsic is based on delight and desire of learning which is internal, extrinsic is based on rewards and benefits learning brings-in which is mostly external. Both are influenced by various factors. Malone and Lepper (1987) define intrinsic motivation into two categories, individual motivation and interpersonal motivation; they are challenge, curiosity, control, recognition, cooperation, competition and fantasy. Extrinsic on the other hand is based on benefits that's comes through learning. However, even when students are extrinsically coerced to engage in such (learning) activities, what they learn and how effectively they learn may be influenced by their level of intrinsic motivation" (Malone & Lepper 1987). Therefore, creating and sustaining this intrinsic motivation is vital for better result in second language classroom.

The purpose of this research is to identify which of the factors influence more the intrinsic motivation of the Rural-Urban fringe (R-U fringe) learners towards learning English as second language. Identifying the level of influence of these factors in intrinsic motivation on a learners group will help the instructor to interfere in interpreting the syllabus, creating or modifying the teaching materials through motivating activities and methodology. This will always keep the learners motivation high towards learning English in a second language classroom. As each and every learner's motivation level varies, each and every group of learner's motivation level also varies. Therefore, studying each of this group/class/community's motivation level and the factors that motivate is important.

The study was set in the R-U fringe area of Chennai- one of the metropolitan cities of India among the tertiary level learners.

II. PRELIMINARIES

Rural- Urban Fringe Learners:

Walter Firey a sociologist explains Rural-Urban fringe area as a "… structural units (which) include slums and squatter-settlements, built-up dwellings without any proper plan, mixed land uses, areas of agricultural production usurped by lot of industrial units, dispersed location of settlements suffering from urban facilities…." (1947). Thus the R-U Fringe learners are dwellers of those slums and squatter-settlements, built-up dwellings without proper plan, mixed land uses and those who suffer from urban facilities i.e. students who are not urban, living / exposed / experiencing the advantages of urban way of living. As the urban area expands and it engulfs the rural places around it, it gives rise to this new group of learners called R-U fringe.

INTRINSIC MOTIVATION:

The factors that affect the intrinsic motivation are Challenge, Curiosity, Control, Recognition, cooperation, competition and fantasy.

Challenge:

Challenge is defined in Merriam webster dictionary as "the act or process of provoking or testing physiological activity by exposure to a specific substance." An optimal level of challenge always increases the level of motivation to participate in activities. Presence of explicit goals is must.

Curiosity:

It is a strong desire to know or learn something. It is a desire to know why something happened or how something works.

Control:

It is the ability "to see themselves (oneself) as capable individuals who can exert some influence over events and outcomes."

Recognition:

It is a desire to be identified or acknowledged by others; being praised or appreciated for what they do.

Cooperation:

It is an ability to work in a team in consent with one another to achieve a common goal. It is a joy of working together with cooperation and accordance.

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Competition:

The spirit of being challenged, and having a sense of achievement to excel in something in completion or in comparison with one others.

Fantasy:

It is an ability to imagine. Associating oneself with the characters, content, and text which is used to teach language.

2. Degrees of the Nonagonal fuzzy number

Linguistic terms	Linguistic values
No influence	(0,0,0,0,0,0.04,0.08,0.12,0.16)
Very Low influence	(0,0.04,0.08,0.12,0.16,0.20,0.24,0.28,0.32)
Low influence	(0.16,0.2,0.24,0.28,0.32,0.36,0.4,0.44,0.48)
Medium	(0.32,0.36,0.4,0.44,0.48,0.52,0.56,0.6,0.64)
High influence	(0.48,0.52,0.56,0.6,0.64,0.68,0.72,0.76,0.8)
Very High influence	(0.64,0.68,0.72,0.76,0.8,0.84,0.88,0.92,0.96)
Very Very High influence	(0.8,0.84,0.88,0.92,0.96,1,1,1,1)

III. ALGORITHM FOR NANOGONAL FUZZY COGNITIVE MAPS

"When the nodes of the **N_gFCM** are fuzzy sets then they are called as Fuzzy Nonagonal nodes.**N_gFCM** with edge weights or causalities from the set {−1, 0, 1} are called simple **N_gFCM**.A **N_gFCM** is a directed graph with concepts like policies, events, etc., as nodes and causalities as edges. It represents causal relationships between concepts. Let **N_gR_1**, **N_gR_2**,…, **N_gR_n** be the nodes of a **N_g**FCM. Y=(y1, y2,…,yn) where **N_g**eij∈{−1, 0,1}. Y is called the instantaneous state vector and it denotes the on-off position of the node at an instant.

Instantaneous vector =

$$\begin{Bmatrix} N_g a_i = 1 & ,Maximum(weight) \\ N_g a_i = 0 & ,Otherwise \end{Bmatrix}$$

When there is a feedback in a **N_g**FCM, i.e., when the causal relations flow through a cycle in a revolutionary way, the **N_g**FCM is called a dynamical system. "

4. Method of determining the hidden pattern of N_gFCMs

Step 1: when N_gR_1 is switched ON to find the hidden pattern, the vector $Y_1 = (1, 0,…, 0)$, pass through the relation matrix F, (i.e) Y_i *F

Step-2: Let Y_i**N_g** (F) = (y1, y2,…, yn) get a Nonagonal vector

Step-3: Add all Nodes call it be a sum Y_i**N_g** (F) sum

Step-4: Let Y_1**N_g** (F) Max(weight) , replacing y_i by 1 if y_i is the maximum weight of the Nonagonal node (i.e.,yi=1), otherwise by 0 (i.e., yi=0).

Step-5: Find Y_2**N_g** (F)Average

Step-6: This procedure is repeated till we get a limit cycle or a fixed point

5. Concept of the problem

We have taken the following 7 concepts The following concepts are taken as the main nodes of our problem.

N_g R_1 –**Curiosity.**
N_g R_2- **Challenge**
N_g R_3-Control.
N_g R_4- Recognition.
N_g R_5-**Cooperation**
N_g R_6-**Competition**
N_g R_7-**Fantasy**

N_g R_1-**Curiosity.** Curiosity pushes us to explore and learn for the sole pleasure of learning and mastering.

N_g R_2-**Challenge**. Being challenged helps us work at a continuously optimal level work toward meaningful goals.

N_g R_3-**Control**. This comes from our basic desire to control what happens and make decisions that affect the outcome.

N_g R_4**Recognition**. We have an innate need to beappreciated and satisfaction when our efforts are recognized and appreciated by others.

N_g R_5-**Cooperation**. Cooperating with others satisfies our need for belonging. We also feel personal satisfaction when we help others and work together to achieve a shared goal.

N_g R_6-**Competition**. Competition poses a challenge and increases the importance we place on doing well.

N_g R_7-**Fantasy**. Fantasy involves using mental or virtual images to stimulate your behavior. An example is a virtual game that requires you to answer a question or solve a problem to move to the next level. Some motivation apps use a similar approach.

Now we give the connection matrix for the 7 attributes.

Connection matrix is given by

N_g (F)=

	N_gR_1	N_gR_2	N_gR_3	N_gR_4	N_gR_5	N_gR_6	N_gR_7
N_gR_1	0	*L*	*L*	*H*	*L*	*L*	*VL*
N_gR_2	*L*	0	*L*	*VL*	*M*	*H*	*VVH*
N_gR_3	*NI*	*H*	0	*M*	*VH*	*NI*	*H*
N_gR_4	*H*	*H*	*L*	0	*VL*	*L*	*VL*
N_gR_5	NI	L	L	NI	0	H	M
N_gR_6	NI	VH	M	L	L	0	VL
N_gR_7	VH	M	M	VL	NI	NI	0
N_gR_8	H	VVH	VH	L	VL	NI	H
N_gR_9	L	L	L	VVH	VL	VL	VL
N_gR_{10}	*L*	*VL*	*VL*	*VH*	*M*	*H*	*H*
N_gR_{11}	*H*	*H*	*VH*	*H*	*M*	*L*	*VL*
N_gR_{12}	*VVH*	*H*	*H*	*M*	*NI*	*VL*	*VH*
N_gR_{13}	*VH*	*H*	*M*	*VL*	*L*	*M*	*H*
N_gR_{14}	*M*	*VVH*	*L*	*VL*	*NI*	*M*	*M*
N_gR_{15}	*NI*	*H*	*M*	*H*	*L*	*VL*	*H*
N_gR_{16}	*H*	*H*	*VH*	*M*	*L*	*VL*	*L*

N_g (F)=

	NgR_1	NgR_2	NgR_3	NgR_4	NgR_5	NgR_6	NgR_7
NgR_1	0	(0.16..0.48)	(0.16..0.48)	(0.48..0.8)	(0.16..0.48)	(0.16..0.48)	(0,..0.28)
NgR_2	(0.16..0.48)	0	(0.16..0.48)	(0,..0.28)	(0.32..0.64)	(0.48..0.8)	(0.8,..1)
NgR_3	(0...0.16)	(0.48..0.8)	0	(0.32..0.64)	(0.64..0.96)	(0...0.16)	(0.48..0.8)
NgR_4	(0.48..0.8)	(0.48..0.8)	(0.16..0.48)	0	(0,..0.28)	(0.16..0.48)	(0,..0.28)
NgR_5	(0...0.16)	(0.16..0.48)	(0.16..0.48)	(0...0.16)	0	(0.48..0.8)	(0.32..0.64)
NgR_6	(0...0.16)	(0.64..0.96)	(0.32..0.64)	(0.16..0.48)	(0.16..0.48)	0	(0,..0.28)
NgR_7	(0.64..0.96)	(0.32..0.64)	(0.32..0.64)	(0,..0.28)	(0...0.16)	(0...0.16)	0
NgR_8	(0.48..0.8)	(0.8,..1)	(0.64..0.96)	(0.16..0.48)	(0,..0.28)	(0...0.16)	(0.48..0.8)
NgR_9	(0.16..0.48)	(0.16..0.48)	(0.16..0.48)	(0.8,..1)	(0,..0.28)	(0,..0.28)	(0,..0.28)
NgR_{10}	(0.16..0.48)	(0,..0.28)	(0,..0.28)	(0.64..0.96)	(0.32..0.64)	(0.48..0.8)	(0.48..0.8)
NgR_{11}	(0.48..0.8)	(0.48..0.8)	(0.64..0.96)	(0.48..0.8)	(0.32..0.64)	(0.16..0.48)	(0,..0.28)
NgR_{12}	(0.8,..1)	(0.48..0.8)	(0.48..0.8)	(0.32..0.64)	(0...0.16)	(0,..0.28)	(0.64..0.96)
NgR_{13}	(0.64..0.96)	(0.48..0.8)	(0.32..0.64)	(0,..0.28)	(0.16..0.48)	(0.32..0.64)	(0.48..0.8)
NgR_{14}	(0.32..0.64)	(0.8,..1)	(0.16..0.48)	(0,..0.28)	(0...0.16)	(0.32..0.64)	(0.32..0.64)
NgR_{15}	(0...0.16)	(0.48..0.8)	(0.32..0.64)	(0.48..0.8)	(0.16..0.48)	(0,..0.28)	(0.48..0.8)
NgR_{16}	(0.48..0.8)	(0.48..0.8)	(0.64..0.96)	(0.32..0.64)	(0.16..0.48)	(0,..0.28)	(0.16..0.48)

Attribute $\mathbf{N_g}R_1$ is ON:

$Y^{(1)}$ = (10000000)

$Y^{(1)}$ $\mathbf{N_g}$ $(F)_{weight}$= (0,(0.16…0.48), (0.16…0.48),(0.48,…0.8), (0.16…0.48), ((0.16…0.48),(0,…0.28),(0.48,…0.8),

$Y^{(1)}$ $\mathbf{N_g}$ $(F)_{Average}$= (0,0.32,0.32,0.64,0.32,0.32,0.1244,)

$Y^{(1)}$ $\mathbf{N_g}$ $(F))_{Max(Weight)}$= (0.74664,0.5973,0.5516,0.1161,0.29865,0.5516,0.5973,)

=(1,0,0,0,0,0,0,) = $Y_1^{(1)}$

$Y_1^{(1)}$ $\mathbf{N_g}$ $(F))_{Average}$ = (0.9333,0.64,0.64,0.5911,0.0444,0.1244,0.8,)

$Y_1^{(1)}\mathbf{N_g}(F)_{Max(Weight)}$=(0,0.2986,0.2986,0.5973,0.2987,0.2987, 0.1161,)

= (0, 0, 1, 0, 0, 0, 0,) = $Y_2^{(1)}$

$Y_2^{(1)}$ $\mathbf{N_g}$ $(F))_{Average}$ = (0.8,0.64,0.5911,0.1244,0.32,0.5911,0.64,0.32,)

$Y_2^{(1)}$ $\mathbf{N_g}(F)_{Max(Weight)}$= (0.8710,0.5973,0.5973,0.5517,0.0414,0.1161,0.7466,)

= (1,0, 0, 0, 0, 0, 0,) = $Y_3^{(1)}$

$Y_1 = Y_3^{(1)}$

Do the process for the remaining attributes

Attributes	N_gR_1	N_gR_2	N_gR_3	N_gR_4	N_gR_5	N_gR_6	N_gR_7
10000000	0.8	0.64	0.5911	0.1244	0.32	0.5911	0.64
01000000	0	0.32	0.32	0.64	0.32	0.32	0.1244
00100000	0.0444	0.64	0	0.5911	0.8	0.0444	0.64
00010000	0.0444	0.64	0.5911	0.64	0.32	0.1244	0.64
00001000	0.0444	0.64	0.5911	0.64	0.32	0.1244	0.64
00000100	0.8	0.64	0.5911	0.1244	0.32	0.5911	0.64
00000010	0.8	0.64	0.5911	0.1244	0.32	0.5911	0.64
Total weight	7.422	9.4044	7.9554	6.693	6.8933	6.1997	8.6932
Average	0.463875	0.587775	0.4972125	0.4183125	0.4308313	0.3874813	0.543325
Rank	4	1	3	6	5	7	2

Table-2 Weightage of the attributes

VI. CONCLUSION

Nonagonal Fuzzy Cognitive Maps (N_gFCM) enabled the ranking to. The ranking of the attributes are

N_gR_2 - Challenge,
N_gR_7-Fantasy
N_gR_3-Control,
N_gR_1 –Curiosity,
N_gR_5-Cooperation,
N_gR_4- Recognition,
N_gR_6-Competition.

Thus the factors that influence the intrinsic motivation of the R-U Fringe learners from high to low are challenge, fantasy, control, curiosity, cooperation, recognition and competition. Therefore if the activities and materials that are provided are more of challenging and less of competition, the learner's motivation level will be high in learning English.

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