



INTRODUCTION



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1. THE CONTEXT OF THE STUDY

One of the present day problems faced by the educationalists and the education system is the set of issues of the Underprivileged Rural College Students (URCS) studying in city colleges. Students from rural areas studying in city colleges are said to escape the problems in college and classroom by solutions such as committing suicide. These students claim in their suicide note that they committed suicide due to their inability to develop speaking skills in English.

Times news network reports as follows:

Eng, Bullies psych out first-generation learners.

Chennai, Born to parents who are labourers in a village near Salem, K. Gopal is the first from his family to finish school. But, for the 19 year old civil engineering student who topped the Tamil medium school in his village, graduating from college is still a distant dream.

Inferiority complex that stems from being unable to match their colleagues in professional colleges is pushing many first generation learners to quit or in extreme cases even end their lives, say experts. According to Velicham an NGO working with first generation learners, more than 700 students approached its helpline in distress over the last 10 months.

“These are the students who do very well in school and get into engineering or medical colleges but are unable to cope especially due to the English language barrier,” says Sherin, Velicham founder president. 80% of these students say they feel ridiculed by their classmates

because of their bad English. The rest say they are looked down upon because of the colour of their skin, financial and family background and even dress.

Some say that although every class has many students from Tamil Medium schools little is done to ensure they are able to cope with. “We don’t understand anything in class and we have to approach the teachers after every class and ask them to re-explain the concepts to us. Very few teachers take the interest and give us extra attention,” says Gopal.

Seventy of the 150 students in his class at the Government Engineering College in Salem are from Tamil medium schools. Gopal adds, “Almost all Tamil medium students get arrears in the first year and it gives the rest of the class another reason to look down upon us.”

Students say that many first generation learners who are unable to understand even simple terms, lose interest and try to pass the examination by memorizing the answers. “Many are not even able to recognize terms like frequency in Physics or write a simple sentence in English in the exam” says K. Sumathi, an ECE student at Velammal Engineering College. Twenty of the 150 students in her class belong to Tamil medium school.

“Sometimes the teachers also ridicule them by reading out their papers aloud in class and chide them for not being able to write properly”, she says.

Times of India, Chennai, Nov. 2, 2011.

Student suicides up by 26% in five years.

Chennai, Delhi and Mumbai had most victims.

New Delhi: While 5,857 student suicides were reported in 2006, the figures jumped to 7,379 in 2010 according to data released by the National Crime Records Bureau. In other words, 20 students killed themselves every day in 2010 something both academicians and mental health professionals blame on flawed education system where performance pressure ranks above all else.

It was reported from New Delhi in Times of India that “Suicide exposes ills of system in AIIMS”.

The suicide out of depression, by a reserved category first year MBBS student, Anil Kumar Meena at the All India Institute of Medical Sciences (AIIMS), New Delhi, on Saturday has brought to focus once again the plight of SC/ST students at the premier medical institution. Anil Kumar failed in supplementary papers for his first year examination. Supplementary exams are for those who fail to pass in the regular examinations. He could not sit for regular examination because of insufficient attendance. His failure was apparently due to lack of communication skills in English in which all teaching and examinations are conducted at the institute. It is said that he had complained in the past to his friends of his inability to follow lectures in the class room.

Hailing from Baran district in Rajasthan, Anil Kumar was the son of the poor farmer, Suraj Mal. By all accounts, Anil Kumar was a bright student except for being handicapped by lack of knowledge of English. In fact, he was a ranked student in the AIIMS entrance examination in 2010.

In this context, it is pertinent to highlight again some of the findings of the report of the three-member Thorat Committee constituted in 2006 to “enquire into the allegations of differential treatment of SC/ST students at AIIMS”, which have a direct bearing on this suicide case. The report was submitted in May 2007.

The report observed that there was no initiative to arrange remedial coaching for undergraduate students in English, basic courses or any other spheres for SCs/STs as is required by educational institutions. About 84% of SC/ST students at AIIMS had told the committee regarding the need for such remedial coaching. “In the absence of any special programmes to assist the SC/ST,” the report said that some of the students, if not all, face difficulties in learning and hence in completion of courses and in performance.” According to AIIMS sources, such a scheme is yet to be put in place.

The factor that most probably resulted in Anil Kumar’s failing in the examinations concerns the system currently being followed at the institute for assessment and examination of a student. The AIIMS examination involves both internal and external assessment with 50 percent marks for each. The Thorat committee had noted, “with 50 percent assessment and significant role of individual faculty, gives scope for faculty to misuse this privilege if he / she wishes to do so”.

At the supplementary examination stage, the weightage used to be 25 and 75 respectively. However the weightage for internal assessment was recently increased to 50 like in the regular examination which seems to have adversely impacted Anil Kumar’s performance. Having been barred from appearing in the regular examination, he effectively got only one chance to pass and that too without the benefit of a lower weight for internal assessment.

In principle, of course, as the committee had noted, internal assessment could have been effectively used by the teacher to mentor and handhold the student to get the best out of him / her while imparting skills and knowledge. However this, on the contrary, became a tool for discrimination in teaching sessions, laboratory and clinical work, the committee had noted. Based on statements by SC/ST students the report observed that SC/ST students did not receive the kind of support the other students received from their teachers.

“Given the dependence of students on teachers for learning the skill, the lack of adequate support of SC/ST students reflects in performance and psychological problems” the committee observed.

“The self reported experiences of SC/ST students” the report said, “indicate that discrimination takes the form of avoidance, contempt, non cooperation, discouragement and differential treatment by teachers towards these students.”

The report also observed that the AIIMS did not have a special cell for SC/ST students to deal with their difficulties (academic, financial, language) to cope with a strenuous academic programme taking into account their background origins.

In fact, without redressal mechanism in place, Anil Kumar had apparently tried to meet the Director thrice but could not.

This is the problem not only with city arts colleges or engineering colleges or medical colleges but more so in the prestigious technology institutions like IIT's.

Times of India, Chennai Thursday May 5, 2011 reports: IIT student commits suicide on campus. Ends life after graduation was put on hold. A final year IIT - M student committed suicide in his hostel room on Wednesday. Nitin Kumar Reddy, a Mechanical engineering student ended life at 2.45 pm, minutes after being told that he would not be able to pass out with his batch mates in May. Three months ago, another student of the same department had killed himself for a similar reason.

According to his batch mate, Nitin 22, was upset after the head of the department Venkateshan SP told him that his course has been extended for six

months when he went to submit the abstract of his project. Nitin emailed his father Lakshmana Murthy Reddy, a DRDO official working in Delhi, saying that he was going to end his life as he was scared that the course extension might ruin his job opportunities. He also called his friend in Bangalore to inform her about his decision. By the time his parents and the friend could alert his batch mates, he hung himself from the ceiling fan inside his hostel room no. 463 with a bed spread. IIT-M officials refused to comment to TOI.

On February 25, V. Anoop 26 of the same department also hung himself, as he could not complete his project, even after he got the course extended. Both Nitin and Anoop committed suicide due to academic reasons (project extensions).

Times Chennai. Not only the problem of suicides which exposes the ills of the system in IITs but also 80% of IITians are of poor quality says Narayana Murthy. (Times of India, Chennai, October 4, 2011. Reporting from New York).

New York: Voicing his displeasure over the quality of engineers that pass out of the IITs, Infosys Chairman emeritus N.R. Narayana Murthy has said there is a need to overhaul the selection criteria for students seeking admission to the prestigious technology institutions.

Addressing a gathering of hundreds of former IITians at a 'Pan IIT' summit here, Murthy said quality of students of Indian Institutes of Technology (IITs) has deteriorated over the years due to the coaching classes that prepare engineering aspirants.

He said that the majority of the students fare poorly at jobs and in global institutions of higher education. Thanks to the coaching classes today, the quality of students entering IITs has gone lower and lower.

Murthy said it, receiving a thundering applause from his audience.

Coaching classes teach aspirants limited sets of problems out of which a few are asked in the examinations. They somehow get through the joint entrance examinations. But their performance in IITs, at jobs or when they come for higher education in institutions in the US is not as good as it used to be.

More emphasis has to be given to research at the under graduate level and examinations should test independent thinking of students rather than their ability to solve problems. Murthy says that in order to produce good research at IITs the Indian government has to be persuaded to create institutions that fund research projects. In addition, faculty members should also be evaluated annually on their research performance by an independent committee. Murthy said, adding that India must shift from tenure system to a five year contractual appointment system.

The Infosys mentor also lamented the poor English speaking and social skills of a majority of IIT students, saying with Indian politicians, “rooting against English”, the task of getting good English speaking students at IITs becomes more difficult.

Sunday Times of India, Chennai Nov. 18, 2012.

HRD minister Pallam Raju suggested that counseling services in technical institutions could be made a component in accreditation processes and that special weightage be given to the provision.

Give counseling services: Panel to Institutions.

Chennai. All Central government Funded Technical Institutions (CFTIs) in the country including the IITs, IITMs and NITs have been advised

to set aside Rs. 50 lakh a year to provide counseling services and conduct activities to ensure the mental health of their students.

The task force headed by professor M. Anandkrishnan, designed a questionnaire for the CFTIs to assess the existing mental health needs, understanding the magnitude of the problem and the ascertain the resources. Of the 86 CFTIs asked to fill out the questionnaire, only 26 responded. Of this more than half do not have full time counselor and 10 have scope for students to declare their mental health problems.

“The problem is only going to grow,” said Anandkrishnan. Raju suggested that the counseling services be made a component in the accreditation process and a special weightage be given to the provision.

The task force has suggested that the government set up an empowered committee on lines of the Raghavan committee on ragging, “as it cannot be assumed that they will be followed by all CFTIs with the same degree of rigour and seriousness”. The empowered committee should facilitate the establishment of a common database relating to the incidents of suicide and availability of support systems.

Anandkrishnan suggested that institutions stop acting defensive. “There is a tendency to brush such incidents under the carpet. People should be frank and analyse the reasons to see it does not happen again. The survey revealed that over the last two years the institutions reported that 12 students committed suicide and 18 attempted suicide.”

Member of the task force and founder of Sneha suicide helpline Dr. Lakshmi Vijayakumar said that with three of the 12 students who committed suicide, being first years and seven, coming from ST and OBC backgrounds, there seems to be problem of adjustment.

2. THE RELEVANCE OF THE STUDY

We see most of the Underprivileged Rural College Students studying in city colleges are from OBCs/SCs/STs. Further, if these students are well motivated or properly counseled with real values of education, they would, by no means, go to the extreme level of suicide.

We have given only a few instances to show the main issues and problems faced by Underprivileged Rural College Students (URCS) studying in city colleges. We see the problems arise due to lack of communication skills, appearance, poverty and above all lack of grasp of English as well as problems to express in English and follow the lectures in class, ill treatment by classmates / teachers and teachers' partiality in class and while evaluating them for marks.

These URCS suffer humiliation in class room as well in the hostel which slowly leads to stress and, later on, develop into inferiority complex. Moreover, almost all these URCS are first generation learners. If they are unable to cope with they take the extreme step of committing suicide or leaving the course.

Thus, in this study, we have taken up the most challenging present day problem of the URCS studying in city colleges. This study, in particular, is very demanding and needs a solution for the problems faced by rural students studying in city colleges. In fact, the number of URCS is ever increasing, and they are the majority studying in city colleges.

To know the problems, we made a pilot study of URCS studying in city colleges. Their problems ranged from poverty, no proper motivation, family problems, communication skills, lack of knowledge in English, spoken and

written, not in a position to follow the lectures in English in the classroom, reaction / insults by their classmates from city, teachers' indifference and or insults URCS undergo in classroom or in college campus, managements' ignorance on the problems of URCS and so on.

We see from our pilot survey that these URCS suffer a lot of psychological, cultural and social problems. Such types of sufferings make them unproductive not only in their studies but also, later on, in life, even if they complete the courses and get their degrees. In some cases, they go to the extreme level of committing suicide. So, we, in the first case from the pilot survey, found that only fuzzy models would be appropriate for the two well-known reasons.

- (i) The problems of URCS cannot be measured as a statistical data for attributes are feelings of suppression, sufferings and injury of insults for being not in a position to communicate in English or due to appearance or poverty and above all, incapability to behave
- (ii) like city students. Only FCMs and FRMs are the best suited fuzzy models as the data is an unsupervised one and these models alone can give the hidden pattern of the problem.

“Perceptions of rural community college students of the transfer process to a four-year institution an exploratory study” was made by Elizabeth E. Sacksteder La Clair, a project of the University of Alabama and funded by the Jack Kent Cooke Foundation. They have used elaborate questionnaire to get the problems of theirs. However, it is different from our study, for, our students coming from rural areas to get higher education are not only from rural areas but also are the first generation learners and do not belong to community college, as in case of Australia, Canada, Malaysia, U.K and U.S. [31].

The Indian education scenario is peculiar for many of the students who come from the underprivileged rural areas to study in city colleges are toppers in their schools. Most of them get the seat by merit but the only disadvantage is that they have done their schoolings from first standard to 12th standard in Tamil Medium (or in one of the state languages to whichever state they belong). Not knowing English is their only handicap. They are intelligent, bright, hardworking and have good knowledge and grasp only if the medium of instruction is their mother tongue or the language in which they have done their schooling. So the problem is as how to equip them with English, for several of them acknowledged that they are not in a position to write even a single sentence in English and they do not follow anything in class as the lectures are in English. What sort of measures the government and the educationalist should do to make these URCS come up in life? It is observed that this is the only study in this direction made here in this thesis.

Our observation is substantiated by an article in The Hindu dated 12 April 2012 which say “Language barrier puts students from Tamil Medium in a fix”.

Nearly 70% of students who joined Engineering education in 2011 - 12 came from Tamil Medium Schools. 50% of the class comprises students from Tamil medium school. Surprisingly most students face maximum difficulty with Mathematics that is integral to Engineering, at least for first two years. Even those who speak in English fail in Mathematics and they write theorems or some explanations to get some marks so on and so forth. Despite private Engineering colleges’ claims that they offer bridge courses, spoken English classes and facilities such as language laboratories, students from rural backgrounds have only their teachers for support, particularly, in the first year.

The issue assumes significance as 68% of students who joined Engineering education in 2011-12 came from Tamil medium schools.

Likewise, in case of medicine, they do not lack talent but “medical English” is tough and without help from teachers or other students it is really difficult.

One year is not adequate for them to learn the language and subject.

Another suggestion, given by one and all about underprivileged rural students studying in city colleges, is to give them money or stipend to pay fees, etc. This is not a complete solution to their problem. It can only be a partial solution to the problems they face in the city college atmosphere.

3. THE OBJECTIVE OF THE STUDY

We aim to analyse it mathematically by mainly using fuzzy models. We do not analyse the problems sociologically.

For fuzzy mathematical models have been used to analyse several social problems. We use fuzzy models to analyse and study the problem of URCS.

The fundamental concept of fuzzy reasoning by Zadeh L.A. in [109]: its use in engineering disciplines has been widely studied. It has been reported over thousands of commercial, psychological and social problems that are successfully analysed, using fuzzy systems. Fuzzy theory which is based on membership of functions and it speaks of the matters of degree to which an attribute / concept is a member or sometimes a non member. It mechanizes psychology, hence is helpful in solving problems which are associated with feelings, and constructing appropriate fuzzy models highly depend on the problems at hand.

It gives a very sensitive interpretation of probability and randomness.

Mathematically fuzziness means multivaluedness or multivalence [69, 70]. Fuzzy Cognitive Maps (FCMs) are fuzzy signed directed graphs and

have been used by Taber [81-82] to model gastric-appetite behaviour and popular political developments. Styblinski in [74] used FCMs to analyse electrical circuits, Gotoh and Murakani [34] have used FCMs to model plant control. Axelrod proposed cognitive maps in [3] as a formal tool for decision making. Based on cognitive maps structure in [47], Kosko proposed fuzzy cognitive maps. In [24], Craiger et al studied modeling organizational behavior with fuzzy cognitive maps. In [87], Tsadiras and Margaritis studied the application of using certainty neurons in fuzzy cognitive maps. In [93,103], Indra has used FCMs to analyse the passengers transportation problem. FCMs have been used in 2004 to study and analyse the social aspects of migrant labourers living with HIV/AIDS [96]. FCMs were used by W.B.Vasantha, Florentin Smarandache, et al. to study and analyse Periyar's views on untouchability [92].

In [100] FCMs were used to analyse problems of people with disability. Thus FCMs have been a very powerful and a favourite tool used by scientists and researchers when the data they have at hand is an unsupervised one.

Next, in this thesis, we use yet another fuzzy model called the Fuzzy Relational Maps (FRMs) model constructed in the year [95] by W.B. Vasantha and Yasmin Sultana. This new model was used in the study of Employee - Employer relationship. The description of these models will be carried out in chapter 00, Preliminaries of this thesis.

Finally, the notion of super matrices was introduced in [39]. This was developed into super linear algebras in [98] by Vasantha and Smarandache. We have used these concepts to build fuzzy models in this thesis.

In this thesis, we study about the problems of underprivileged rural college students, studying in city colleges. Here, we have built new mathematical fuzzy models to study this problem.

4. THE STRUCTURE OF THE THESIS

This thesis consists of the following seven chapters:

00. Introduction
01. Fuzzy analysis of problems faced by URCS using FCMs and FRMs models
02. Fuzzy new models- SFCMs, SFRMs and FLCMs
03. Fuzzy analysis of problems of URCS using SFCMs and SFRMs models
04. Fuzzy analysis of problems faced by of URCS using the FLCMs and FLRMs models
05. Fuzzy models- a comparative study of the hidden patterns
06. Conclusion and recommendations

References

5. THE METHODOLOGIES IN THE STUDY

In this thesis, we collect the basic definitions needed to make this thesis a self contained one which is given in preliminaries of this thesis. In chapter one, the application of the FCMs and FRMs models to the URCS problem is worked out by using a pilot survey about URCS. The techniques, followed in this thesis, are briefly explained in the following steps.

- A pilot study was done with 100 students from various colleges, and the research followed / revealed to us some of the key and basic problems and challenges of the underprivileged rural students faced in city colleges in Chennai.
- This led to the formulation of a full-fledged questionnaire containing in details starting from personal information,

- This lengthy and comprehensive questionnaire, both in English and Tamil side by side, served and administered to 650 city students drawn from mainly Arts and Science Colleges of both private and Government ones, and good many Engineering colleges taking into consideration the proliferation and mushrooming of such institutions, vastly private run.
- We understand and recognise that the ‘role of a teaching community’ is so vital and crucial in the formation and development of any given student community either at the school levels or at the tertiary levels. For, they are considered, as the Tamil saying goes- ‘Andavanukku Adduthathu Aasaan’- which means, ‘Next to God is the Teacher’. Such is the coveted and high position, the teaching community enjoys and assumes; it also signifies their importance in any society.
- Therefore, in order to elicit the opinions and views of the teaching community in different colleges in Chennai city, broad based questionnaire was served and their inputs were also taken into consideration to view and to study the student community from the perspective of the teachers. In the process, this questionnaire also enabled us to see many factors about the teaching community itself. To scrutinize their perceptions of different realities connected to the colleges and student community, and to assess their capabilities and talents, limitations and weaknesses. Hence, our study remains holistic and comprehensive. This enabled us to suggest the possible solutions and action plans to the issues faced by URCS.
- Finally, taking possible cues and insights from these above mentioned process, the questionnaire was evolved as ‘key’ and ‘vital’ factors that go to formulate our linguistic mathematical fuzzy models in chapter five.

Based on this survey, we had used these two model to analyse the problem and derive some conclusions and suggestions. This study led to the use of comprehensive and elaborate questionnaire to get information from the URCS.

In chapter two of this thesis we have defined new mathematical fuzzy models called the new Super Fuzzy Cognitive Maps (SFCMs) models, Super Fuzzy Relational Maps (SFRMs) model and Super Fuzzy Cognitive Relational Maps (SFCRMs) model using the super diagonal matrices. After studying the answers of the lengthy questionnaire we found that the writing communication skills of these URCS both in English as well as in their mother tongue were so poor and the answers in the lengthy questionnaire, were not up to the mark. So we had to formulate an objective short questionnaire. This new model was constructed after analyzing the elaborate questionnaire and consequently another objective new questionnaire was evolved.

After studying the two collected data, we found this newly constructed model would be best suited for our problem.

Also, in this chapter, we have introduced a new model called fuzzy linguistic cognitive maps (FLCHs) model to analyse and study the problem.

In chapter three, we use this newly constructed super fuzzy model to analyse the URCS problems. In chapter four, we use the FLCMs model to study and analyse the problem of URCS.

In chapter five, the comparison of these models by studying the hidden patterns of them is carried out.

In the final chapter we give the suggestion and conclusions based on our analysis of the questionnaire results from discussion with students, government, management, teachers and educationist and finally from the study of the problem, using these fuzzy models.