

Effectiveness of Classroom Teaching and Learning Among Students and Faculty After COVID Pandemic

¹Sathish Kumar Kumaravel, ¹Regan Murugesan, ¹Suresh Rasappan and
¹Nagadevi Bala Nagaram

¹Department of Mathematics
Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology,
Avadi, Chennai – 600062
Tamilnadu, India.

¹College of Technology and Information Sciences University of Technology and Applied Sciences-
Ibri Post Box- 466, Postal Code-516,
Ibri, Sultanate of Oman.

*Corresponding Author: k.sathi89@gmail.com

Article Info

Article history:

Article received on 9 10 2023

Received in revised form 01 11 2023

Keywords:

ATD; RTD; CETD; Fuzzy Matrix

ABSTRACT: This paper brings out a study on the feedback from teachers which is carried out after the pandemic situation. The analysis is performed based on various aspects of classroom teaching after the pandemic such as quality of teaching and effectiveness of usage of tools. The fuzzy models like Combined Effective Time Dependent Matrix (CETD), Average Time Dependent Data Matrix (ATD) and Refined Time Dependent Data Matrix (RTD) are applied using the fuzzy matrix theory concepts for the purpose of analysis to bring out the teachers views about the classroom teaching after the pandemic. The effects of classroom teaching after the pandemic among the students are obtained by using concept of average and standard deviation (SD) of the real data matrices. In order to do the analysis, collect the responses by circulate the few questionnaires' among teachers through the Google forms. The graphical representations for the responses are obtained.

1. INTRODUCTION

The pandemic has brought about numerous understudies losing a consistent everyday practice as they had in school. This has impacted their abilities in general, particularly in essential perusing and composing which has now become more subject to innovation. Depending on recorded addresses and PDF notes and composing schoolwork and tests throughout recent months, they need to begin taking notes and submitting written by hand tasks once they are back to

school. Understudies' resting and eating designs have changed. With remote learning, understudies had the opportunity to go to classes from the solace of their homes. Returning to school implies some additional work and change in the laid back plan they became accustomed to. Every one of these were not an issue during internet learning. The test is to get understudies to return to school on time and follow a plan. Giving understudy's time to re-change is the best way to help them through this time of change [1-4]

Perhaps, for looking at understudy execution, changed factors are thought of, giving a reasonable

comprehension of Coronavirus consequences for the worldwide schooling area. The elements impacting understudy execution incorporate Coronavirus Dread, Distance Learning, Advanced Unavailability, Showing Abilities, Mental Prosperity, and Work-life Struggle. On the essential level, the review demonstrates this multitude of variables to show a hurtful impact on understudy execution, articulating the Coronavirus time frame as a troublesome season of scholastic history.

Section 2 describes the preliminaries and methodology of the work. Section 3 gives the method of collection of raw data. Section 4 and section 5 presents the formation of ATD, RTD and CETD matrix. Section 6 is about the result and discussions with graphical representation for all the parameters between 0 and 1. Finally, the section 7 gives the conclusion of the study.

2. PRELIMINARIES AND METHODOLOGY

The main problem with existing methods in taxonomy prediction, OTU clustering, and denoising is the tradeoff between computational time and accuracy. The length of short reads has a huge impact on this challenge. Furthermore, the best performing tools often may not be open-sourced and free.

Fuzzy matrix has gained recent attention among many researchers. It had got its applications in many real time problems [5-8]. Few of such applications of fuzzy matrix are like study of traffic flow, study of demonetization, study about the view of classroom teaching from teachers' feedback. The theory applied behind this study is fuzzy matrix which involves CETD, ATD and RTD matrix. This paper aims at bringing out the effects and views of Offline classes from teachers' feedback after pandemic using fuzzy matrix models

ATD Matrix
RTD data matrix is obtained from the raw data by taking along the rows with the five categories such as strongly disagree (S_1), disagree (S_2), neutral (S_3), agree (S_4) and strongly agree (S_5) along with the columns of nine questionnaires denoted as $E_1, E_2, E_3, \dots, E_9$. Raising to the teacher's feedback about their opinion and difficulties of after online classes in the pandemic situation. Each entry of the data matrix is reduced into ATD matrix (a_{ij}) by dividing with the time period 10 to be considered. Arithmetic means and the standard deviation of the entries occurs on every column of the ATD matrix was found to bring out the opinion of teachers effectiveness after offline classes among students.

1.2. Structure of RTD Matrix

The RTD matrix is obtained by the expression given below, with a parameter α in $[0, 1]$

- (i) if $a_{ij} \leq (\mu_j - \alpha \times \sigma_j)$, then $e_{ij} = -1$
- (ii) if $a_{ij} \in (\mu_j - \alpha \times \sigma_j, \mu_j + \alpha \times \sigma_j)$, then $e_{ij} = 0$
- (iii) if $a_{ij} \geq (\mu_j + \alpha \times \sigma_j)$, then $e_{ij} = 1$

Where μ_j represents the average and σ_j is the standard deviation of the entries occur in each j^{th} column of ATD matrix. After redefine the ATD matrix into the RTD whose values are belong to the set $\{-1, 0, 1\}$.

1.3. CETD Matrix

In fuzzy matrix models, followed by the ATD, RTD we get the stage of CETD Matrix, it gives the overall combined effect of our analysis from the entries of RTD matrix. At the Final stage, sum of all entries of each row of CETD matrix is evaluated along the questionnaires and responses. A graphical representation of the row sum of matrix with the different parameter values α in $[0, 1]$, is very much effective and easier to understand by the all categories of people, so that this method is very effective to know the views of teachers about offline classes.

This analysis is based on the feedback obtained by teachers for 8 questions related to online classes. The response to these questions is recorded based on five categories such as S_1, S_2, S_3, S_4 and S_5 . The individual responses of 120 faculty of a reputed institution are collected. From the raw data matrix of these responses, ATD and RTD matrices are formed. This help to formulate CETD fuzzy matrix which is used for this study.

3. COLLECTION OF RAW DATA

This study is focus on teachers' feedback or view on the change of online class to offline class. The feedback is collected about the offline classes based on the questionnaires framed from the different aspects like effectiveness of the teaching, usage of online tools to deliver the lecture, network difficulties and quality of the assessments conducted through online platforms. While teaching the online classes, teachers feel easy as well as difficulty in their teaching process. The questionnaire based on the difficulties and ease of the students has been framed.

A sample of 8 questionnaire has been prepared to be circulated using the Google forms to the students of the reputed institution. The questions are prepared

carefully in order to check various aspects of studies through online classes. The following are the questions mentioned below from E_1 to E_8 are circulated to the teachers.

E_1 : Comfortable to attend offline learning classes.

E_2 : The course topics are taught well within the time stipulated for each offline class.

E_3 : Learning enriched through peer discussion, group learning and sharing of course materials.

E_4 : Doubts are clarified very well and no inhibition to ask questions.

E_5 : Attentiveness and interaction make the learning enjoyable.

E_6 : Quality of content delivery for offline course is appreciable.

E_7 : Teaching methods employed in the online to offline classes are effective.

E_8 : Students need counselling session for effective attention in offline class.

The responses of 120 teachers are recorded based on categories of answers are denoted as S_1, S_2, S_3, S_4 and S_5 are Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree respectively. The raw data matrix of the responses obtained are as follows

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	02	02	02	02	02	01	01	01
S_2	02	04	03	07	03	01	01	02
S_3	04	05	01	03	05	02	03	06
S_4	12	22	22	19	15	18	17	22
S_5	30	17	22	19	25	26	26	17

4. FORMATION OF ATD MATRIX

From the raw data ATD and RTD matrices are calculated. Each entry of the respective matrix is divided by ten to obtain the ATD matrix which is given below

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
S_2	0.2	0.4	0.3	0.7	0.3	0.1	0.1	0.2
S_3	0.4	0.5	0.1	0.3	0.5	0.2	0.3	0.6
S_4	1.2	2.2	2.2	1.9	1.5	1.8	1.7	2.2
S_5	3	1.7	2.2	1.9	2.5	2.6	2.6	1.7

Now, to each column elements of the ATD matrix, Average and Standard Deviation are obtained which are listed below.

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
Avg	1	1	1	1	1	0.96	0.96	0.96
S.D	1.06	0.79	0.98	0.75	0.88	1.04	1.01	0.84

5. FORMATION OF RTD AND CETD MATRIX

The RTD matrix related to ATD matrix is obtained based on the formula given in subsection 2.2 by choosing different values of α such 0.1, 0.3, 0.5, 0.7, and 0.9, it helps to form a CETD matrix. The corresponding values for each response for the different α values are obtained which are given as follows.

When $\alpha=0,1$ the RTD matrix is obtained as

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	-1	-1	-1	-1	-1	-1	-1	-1
S_2	-1	-1	-1	-1	-1	-1	-1	-1
S_3	-1	-1	-1	-1	-1	-1	-1	-1
S_4	1	1	1	1	1	1	1	1
S_5	1	1	1	1	1	1	1	1

The RTD matrix obtained for $\alpha=0,3$ is given by

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	-1	-1	-1	-1	-1	-1	-1	-1
S_2	-1	-1	-1	-1	-1	-1	-1	-1
S_3	-1	-1	-1	-1	-1	-1	-1	-1
S_4	0	1	1	1	1	1	1	1
S_5	1	1	1	1	1	1	1	1

The RTD matrix obtained for $\alpha=0,5$ is given by

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	-1	-1	-1	-1	-1	-1	-1	-1
S_2	-1	-1	-1	0	-1	-1	-1	-1
S_3	-1	-1	-1	-1	-1	-1	-1	0
S_4	0	1	1	1	1	1	1	1
S_5	1	1	1	1	1	1	1	1

The RTD matrix obtained for $\alpha=0,7$ is given by

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	-1	-1	-1	-1	-1	-1	-1	-1
S_2	-1	-1	-1	0	-1	-1	-1	-1
S_3	0	0	-1	-1	0	-1	0	0
S_4	0	1	1	1	0	1	1	1
S_5	1	1	1	1	1	1	1	1

The RTD matrix obtained for $\alpha=0,9$ is given by

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	0	-1	0	-1	-1	0	0	-1
S_2	0	0	0	0	0	0	0	-1
S_3	0	0	-1	-1	0	0	0	0
S_4	0	1	1	1	0	0	0	1
S_5	1	0	1	1	1	1	1	0

Using the values from the above RTD matrices, the CETD matrix is obtained as

	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8
S_1	-4	-5	-4	-5	-5	-4	-4	-5
S_2	-4	-4	-4	-2	-4	-4	-4	-5
S_3	-3	-3	-5	-5	-3	-4	-3	-2
S_4	1	5	5	5	3	4	4	5
S_5	5	4	5	5	5	5	5	4

6. RESULT AND DISCUSSION

Graphical representation of row sum matrix for $\alpha=0.1,0.3,0.5,0.7,0.9$ has been figured out. Together with this the graphical representation of combined row sum matrix of all α values together have also been portrayed.

In addition, CETD matrix obtained is also represented graphically. Figures 1 to 5 gives the graphical representation with respect to $\alpha=0.1,0.3,0.5,0.7,0.9$ Figure 6 portrays the graphical representation of combined form of all five α values together. Figure 7 is the CETD matrix represents in graph.

Figure 1 and Figure 2 are graphs which depicts the row sum matrix for the parameter values $\alpha=0.1$ and $\alpha=0.3$. It shows that the greater number of faculty were gave a strongly agree comment and then agree in order to teaching learning effects on offline class after

pandemic for eight questionaries' while comparing all the five categories.

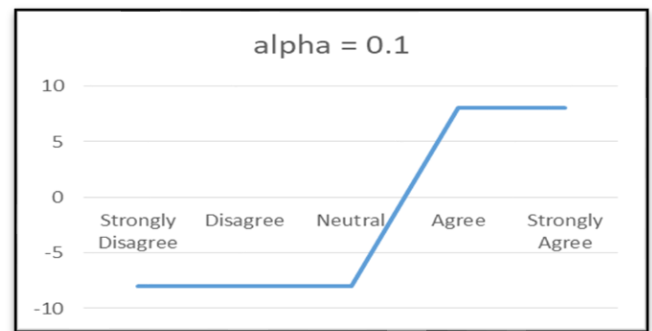


Figure 1: Graphical representation for $\alpha=0.1$



Figure 2: Graphical representation for $\alpha=0.3$

Figure 3 and Figure 4 depicts the graphical representation of row sum matrix for the parameter values $\alpha=0.5$ and $\alpha=0.7$. It shows that the approximately equal number of teachers were gave a strongly agree and agree comments as feedback about students effectiveness of learning on offline class for eight questionaries' apart from the rest of categories. So that the feedbacks about students' performance in offline classes from the teacher sides are in moderate level.

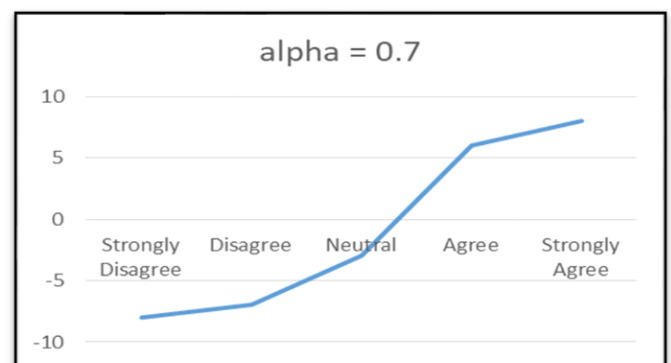


Figure 3: Graphical representation for $\alpha=0.7$

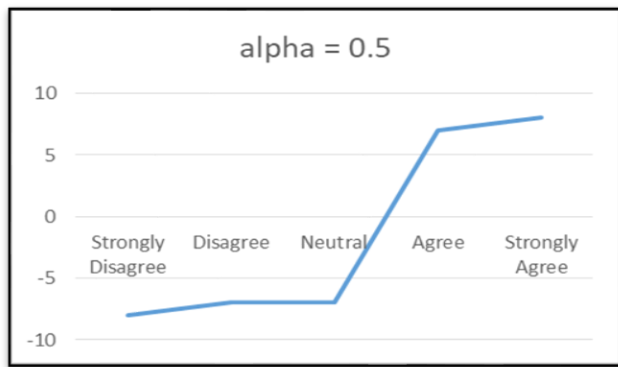


Figure 4: Graphical representation for $\alpha=0.5$

Figure 5 depicts the graphical representation of row sum matrix for the parameter value $\alpha=0.9$. It shows that the greater number of teachers were gave a neutral comment and then agree comments in order as feedback from teachers on students' performance in offline class for eight questionnaires' apart from the rest of categories. So that the feedbacks about offline classes from the teachers' sides are in moderate level.

Figure-6 depicts the Combined graphical representation of row sum matrix for all the parameter values such as $\alpha=0.1, 0.3, 0.5, 0.7$ and $\alpha=0.9$ are representing the as Series1, Series2, Series3, Series4 and Series5 respectively.

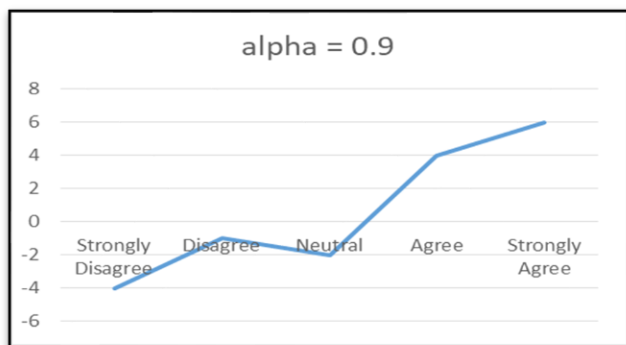


Figure 5: Graphical representation for $\alpha=0.9$

It shows that the greater number of students were gave a neutral comment then agree comments and then strongly agree comments in order as feedback about offline class for eight questionnaires. The rest of categories such as strongly disagree and disagree comments are placed in the negative values. So that the feedbacks about offline classes from the teachers sides are almost in moderate and higher from the moderate level.

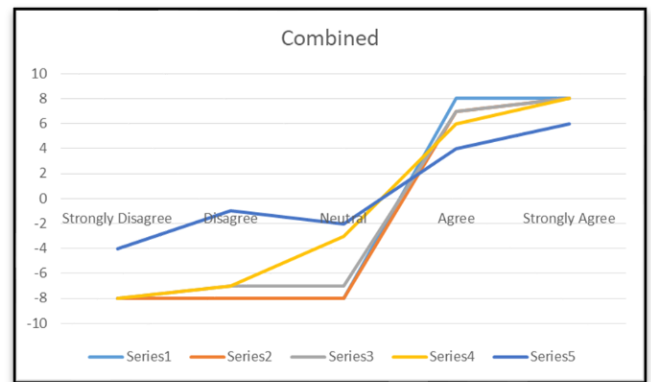


Figure 6: Combined graphical representation for all five α values

7. CONCLUSION

The study on effectiveness and difficulties of offline classes after changing from online classes among the faculty and student has been performed based on the five categories of responses for the eight questionnaires related to the offline class after the pandemic. By using the fuzzy matrix models. The analysis indicates that the teachers response of neutral and agree has reached almost the highest and the same value. The evident for the highest response is clearly showed from the graphical representation of row sum matrices. This analysis shows that the more than the half of the faculty is given the responses as neutral which indicate that students are ready to come forward to adopt themselves with offline study. Based on the analysis the faculty also ready to improve their teaching methodologies and avoid their faults with respect to the students in the offline class and bring their attention to learn for their future.

REFERENCES

- [1] Omar, H. A., Ali, E. M., & Belbase, S. (2021). Graduate students' experience and academic achievements with online learning during COVID-19 pandemic. *Sustainability*, 13(23), 13055.
- [2] Dinu, L. M., Baykoca, A., Dommett, E. J., Mehta, K. J., Everett, S., Foster, J. L., & Byrom, N. C. (2022). Student Perceptions of Online Education during COVID-19 Lockdowns: Direct and Indirect Effects on Learning. *Education Sciences*, 12(11), 813.
- [3] Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students'

perspective. *Sustainability*, 12(24), 10367.

- [4] Alzahrani, M. (2022). Traditional learning compared to online learning during the COVID-19 pandemic: Lessons learned from faculty's perspectives. *SAGE Open*, 12(2), 21582440221091720.
- [5] Szopiński, T., & Bachnik, K. (2022). Student evaluation of online learning during the COVID-19 pandemic. *Technological Forecasting and Social Change*, 174, 121203.
- [6] Nashir, M., & Laili, R. N. (2021). English teachers' perception toward the switch from offline to online teaching during lockdown in the midst of COVID-19 outbreak. *Edukatif: Jurnal Ilmu Pendidikan*, 3(2), 250-260.
- [7] Rahayu, R. P., & Wirza, Y. (2020). Teachers' perception of online learning during pandemic covid-19. *Jurnal penelitian pendidikan*, 20(3), 392-406.
- [8] Rosalina, E., Nasrullah, N., & Elyani, E. P. (2020). Teacher's challenges towards online learning in pandemic era. *LET: Linguistics, Literature and English Teaching Journal*, 10(2), 71-88.