Evaluating Online Education in India: Insights from Teachers

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ABSTRACT
Online education is revolutionizing the academic environment due to its flexibility, providing accessibility to high-quality pedagogy for teachers and students. The National Education Policy of 2020 promotes online education and strongly recommends using resources like "SWAYAM" ("Study Webs of Active Learning for Young Aspiring Minds"), e-Pathshala, and MOOCs ("Massive Open Online Courses"), facilitating anywhere learning for everyone. Although accessibility to education has increased, but its effectiveness is still debatable. This study assesses online education from the Indian educators' standpoint, emphasizing its benefits and drawbacks. This will help find ways to help teachers overcome the challenges they encounter and reach the full potential of this style of instruction in empowering pupils.Triangular fuzzy numbers(TFNs)are used to make decision and "TOPSIS" ("Technique for Order of Preference by Similarity to Ideal Solution") is used to select the best response regarding student non-participation, obstacles faced, and the overall experience of teachers utilizing online learning based on questionnaire data. The proposed method effectively addresses human judgment and uncertainty in responses through the application of Fuzzy TOPSIS.

Keywords: Fuzzy Logic, TOPSIS, MCDM, Online education.

1. INTRODUCTION

The process of teaching-learning is a systematic two-way chronological course of action between a teacher and a student. This procedure aims to transfer knowledge, values and develop skills. Teachers and students both play an equally significant role in the process of knowledge transfer.Teachers guide their students through the learning process by providing relevant information, resources, and conducting activities. They generate an environment that encourages curiosity, critical thinking and active participation. Students take ownership of their learning by contributing actively. They engage in the learning process, collaborate with their peers, and reflect on what they have learnt. Instruction methods include classroom lessons, chalk-and-talk methods, interactive practical sessions, presentations, demonstrations, and related hands-on activities. Virtual student-teacher interactions have been reproduced thanks to internet penetration;however, a lot of improvisation is still required.

By 2030, the National Education Policy, or NEP-2020, seeks to completely overhaul India's educational system. Online education and digital accreditation are key features of this policy. The NEP 2020 emphasizes online education as a crucial component for several reasons such as accessibility, cost effectiveness, flexibility, catering to the large number of students viz-a-viz the scarcity of teachers and experts in various domains, diverse learning requirements, need for skill honing, continued learning during disruptions especially incase of female students, personalized learning experiences etc. Strengthening and enhancing the current digital platforms and ICT-based educational initiatives is the need of the hour.The National Digital Library (NDL),the "SWAYAM" courses, "e-Pathshala", "e-content modules" in various subjects and the "CEC-UGC" YouTube channel, "Free and Open-Source Software for Education (FOSSEE)", "e-Yantra" [1], and "Spoken Tutorial" [2] etc are Indian government's notable initiatives to support the same. The "e-learning"system which Indian government and state governments have set through their many ministries and agencies is exemplified by the "National Knowledge Network" and the "National Project on Technology Enhanced Learning".

During COVID-19 all the educational institutes had to shift to online teaching. This forced universities globally along with India to improvise their physical classroom teaching to online classes [3]. Online education continues to be very popular, post-COVID-19 as well. Digital education has become a vital

substitute for traditional classroom-based learning in India. Enrollment in online courses has increased significantly. In addition to saving a great deal of time, money, and effort by enabling study at any time and from any location, online education also better serves the demands of the swiftly evolving modern economy and society.With the advent of diverse online tools, the digital classroom gives a pragmatic approach that allows smooth interaction between students and teachers. However, there are many challenges to successful online education faced at both ends of the spectrum. Maintaining each student's interest and successfully conveying concepts is the most difficult thing any teacher needs to handle. On the other hand, it is tiring for students to keep themselves glued to their computers and hand-held devices.

Researchers have shown increased interest in online teaching-learning both during and after COVID-19.To investigate the elements impacting student happiness, researchers have created a six-dimensional model to investigate variables such as environment, technology, design, courses, instructors and learners in the light of learners' satisfaction.Learner computer anxiety, instructor attitude, course quality and flexibility, perceived usefulness and simplicity of use, and assessment diversity were among the critical aspects that were shown to be significant. They conclude institutions can improve e-learning implementation and satisfaction with these findings. Tzeng et al, [4]discuss the need for a quantitative evaluation model that considers the interdependence of criteria as well as the subjectivity of perception. The study suggested using DEMATEL to manage dependent relationships and a hybrid "MCDM" "Multi-Criteria Decision-Making" model for factor analysis to handle independent links between criteria. Fuzzy integral and AHP (Analytic Hierarchy Process)methods were used to synthesize subjective experiences.

The current study analyses the difficulties and potential of online learning in India from the viewpoint of teachers. Jain et al. have made available collection of data "COVID-19 Go Away 2021" ("C-19GA21") [5]. This dataset contains responses collected from an online survey through a Google form of around 414 teachers and 683 students regarding various features of online education.

In this study, we aim to find the reasons for lack of participation of students in an online class. We also study the primary difficulties faced by Indian educators on moving to an online platform in contrast to chalk and talk pedagogy. For this, we focus on relevant set of responses from the C-19GA21 dataset.We also examine the teacher's experience with online instruction in addition to this. We believe that concentrating on these elements will enable us to comprehend the situation and recommend suitable measures to raise student engagement and enhance the educational experience for instructors when they are teaching online. A 5-point Likert scale is used to create the teacher survey responses: "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "highly agree." [6].

Instead of quantizing these responses to numerical values, we use a combination of fuzzy logic and TOPSIS [7], [8]to deal with human judgment and uncertainty in responses. We use an approach called FTOPSIS ("fuzzy technique for order of preference by similarity to the ideal solution") to find the major obstacle faced by teachers and their experience related to online teaching. Use fuzzy logic for converting various linguistic responses into TFNs and the "MCDM" approach "FTOPSIS" to evaluate a group of options or alternatives according to a given set of criteria or factors. The importance of each factor is specified by a weight. Each criterion may have a cost, or a benefit effect specified by its impact. The option with the closest Euclidean distance to the positive ideal solution("FPIS") and the furthest from the negative ideal solution("FNIS") is identified by FTOPSIS. We chose the alternatives to be the various options of the answers to the relevant questions of the survey [6]. The criteria were the TFNs created from the responses. Using FTOPSISwe then ranked various alternatives by calculating weights and assigning positive impact to each of the criteria. We obtained the most important reason for the non-participation of students according to the teachers.

In the past, there has been work to analyze the success of online education. As far as we are aware, this is the first effort to rank various reasons for the non-participation of students in online classes using fuzzy logic and TOPSIS. In light of theabove, the primary contributions of the current work are:

- To capture insights from teachers, focus on their experiences, challenges faced by them in taking online classesand evaluate the group of optionsthus collected using an MCDM approach called "FTOPSIS".
- To study the reasons for the absence of involvement of students in online classes.

The paper is organized as follows: Section 2 discusses the related work. Theoretical concepts are covered in Section 3. Section 4describes the methodology used, while Section 5 discusses the findings. Thepaper is concluded in Section 6.

2. RELATED WORK

The state of online teaching and learning has been extensively researched, especially in the pandemic and post-pandemic periods. Henrie et al.[9], highlighted the use of technology in cooperative teaching and

learning processes to enhance curriculum, boost teacher communication, develop stronger community relationships, and deepen student understanding. According to them, it is possible to facilitate anytime, anywhere learning in the classroom by utilizing digital technology, but it might be challenging to keep students engaged in technology-mediated learning.

MCDM approach has been very popular tool for the assessment of e-learning. Zare et al. in [10]studied the significance of MCDM application in assessment of e-learning by various researchers. Authors provided information on MCDM approaches used for evaluation of e-learning evaluation and offer practitioners and scholars a perspective and a course for the future.Sirigiri et al.[11], discussed the requirement of an automated system to implement MCDM methods for teacher-student performance evaluations, teacher rankings, and other contexts. To automate the evaluation process, the authors created an easy-to-use software that incorporates different MCDM techniques, including AHP, Fuzzy AHP, and FTOPSIS. They used two case studies to illustrate the usefulness of the software project evaluation and ICT use in the classroom. Xu et al.[12]applied Fuzzy AHP to choose the best technique for teaching in online mode. They used the geometric mean method based on seven criteria to find the most appropriate approach out of four approaches.

Mamatha et al.[13]proposed an open process for assessing the teachers' performance in "HEIs(Higher Education Institutes)" where multiple disciplines exist. They used "MACBETH" ("Measuring Attractiveness by a Categorical-Based Evaluation Technique")scores to give weights to different criterions to take care of the diverse roles played by the teachers in HEIs. In the study [14] the authors evaluated the effectiveness of the e-learning system from the student's perspective using the regression method and AHP. The success of e-learning was judged by surveys collected from students regarding its quality. Xu et al [12] used "FTOPSIS" to assess the satisfaction of online education in different college's post-COVID-19.

3. Theoretical Concepts

3.1. Fuzzy Set

In the universe of discourse X , a fuzzy set $\tilde{A}$ [15]is represented by $\{(x,\mu_{\tilde{A}}(x) : x\epsilon X\}$, where a membership function $\mu_{\tilde{A}}(x)$links a real number in the interval [0,1] to every element x in X. The grade of the membership function at x in $\tilde{A}$ is determined by its value.

3.2. TFN (Triangular Fuzzy Number)

A TFN [16]given by "$\tilde{A}$=(a,b,c)", is characterized by the "membership function"

$$\mu_{\tilde{A}}(x) = \begin{cases} \dfrac{(x-a)}{(b-a)}, & a \le x \le b \\ \dfrac{(c-x)}{(c-a)}, & b \le x \le c \\ 0 & \text{otherwise} \end{cases}$$

Fig.1 represents a TFN$\tilde{A}$, where 'a' and 'c' correspond to minimum and maximum value of the membership function respectively, while 'b' illustrates the most promising value.

If a = b = c then TFN reduces to a crisp number.

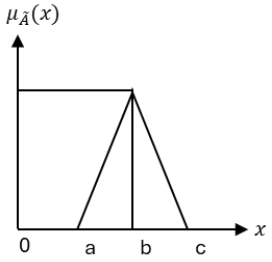

Fig 1. Triangular Fuzzy Number

3.3. The Euclidean distance between two TFNs

Given two triangular fuzzy numbers "$\tilde{A}$as (a_1,b_1,c_1)" and "$\tilde{B}$ as (a_2,b_2,c_2)", the distance between them is defined by the "vertex method" as :

$$d(\tilde{A},\tilde{B}) = \sqrt{\frac{1}{3}[(a_1-a_2)^2+(b_1-b_2)^2+(c_1-c_2)^2]} \qquad (1)$$

3.4. Ftopsis

TOPSIS is one of the most frequently used technique represented by Hwang & Yoon, to compare and rank the alternatives inMCDMproblems[17]. It is predicated on the idea of calculating the separation between the best and worst options. The options are arranged in order of proximity to the optimal answer. The method uses crisp values which are inappropriate to represent the real-world problems as it does not consider the uncertainties and ambiguities. Fuzzy logic has been used to rank the alternatives influencing the online teaching-learning environment. This method of using fuzziness in TOPSIS results in FTOPSIS.Assigning a value in the form of a linguistic variable is more appropriate.The teacher's opinion about the criteria affecting the online teaching-learning is best described in terms of these variables as "strongly disagree","disagree","neither agree nor disagree", "agree", "strongly agree". They can be represented on a scale ranging from 1 to 9 (nine being strongly agree).

3.5. Fuzzy Conversion Scale

Linguistic concepts are transformed into fuzzy numbers with the help of a conversion scale. The consent level used for the fuzzy scale is an odd number (1, 3, 5, 7, 9) as illustrated in Fig. 2 and Table 1.

Table 1: Fuzzy Ratings of "Linguistic Variables"

"Linguistic variables" for alternatives for each criterion	**Linguistic variablesfor each DM**	**TFN membership function**
"Strongly disagree" (SD)	"Very Low"	"(1, 1, 3)"
"Disagree"(D)	"Low"	"(1, 3, 5)"
"Neither agree nor disagree" (NAND)	"Medium"	"(3, 5, 7)"
"Agree" (A)	"High"	"(5, 7, 9)"
"Strongly agree" (SA)	"Very High"	"(7, 9, 9)"

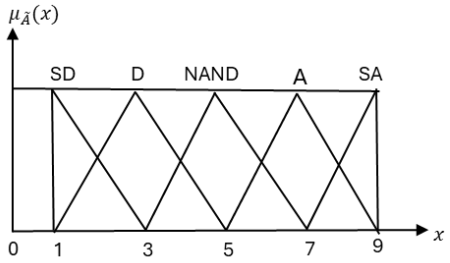

Fig 2. Scale of Linguistic Expression denoting relative importance

4. METHODOLOGY

4.1. Dataset Used

The proposed study uses a subset of the dataset "C-19GA21", available in the open online data repositoryhttps://data.mendeley.com. The data was collected using Google forms, floated in March-April 202 from teachers and students engaged in online classes. The replies show shifts in the participants' views towards COVID-19, emotional, behavioural, social, and cognitive characteristics, as well as mental health metrics.

The data collected includes the following: "Email Address", "informed consent", "attention check question", "basic information" like "age", "gender", "nationality", "state/union territory", "nature of institute", "age group of participants", "subjects taught/learnt","information related to connectivity or access to the Internet", "availability of a device for online teaching/learning","facilities provided by the institution such as e-books", "ergonomic furniture", "data packs for the internet", "software resources", "hardware resources (laptop, tablet, webcam, etc)", "technological or IT support", "training/ FDP/ workshops/ webinars", "MOOCs" and the like.

Questions about the nature of teaching and learning activities were included, including average daily screen time, platforms used, communication methods, average attendance in online classes, comparisons of attendance to previous sessions, reasons for increase or decrease in attendance, percentage of students actively participating in online classes, reasons why students do not participate actively, major challenges faced, pedagogy adopted, attitudes towards online/open book assessments, etc.

4.2. Criteria under study

The current study focuses on the following three questions (criterion) (refer to Tables 2,3, and 4) from the teacher's questionnaire listed below. A panel comprising eminent and experienced teachers from various institutions are the DMs (decision makers).

According to each DM, the response of these alternatives for each criterion is characterized by linguistic variables. Words in a language are used to depict these variables. Here the linguistic variables are denoted by the following terms: 'strongly disagree,' 'disagree,' 'neither agree nor disagree,' 'agree,' and 'strongly agree.' All the responses are transformed into fuzzy numbers by employing the fuzzy conversion scale.

4.2.1. Criterion 1 – Non participation in classes

No course or class can run smoothly without the active participation of its students. Participating in class discussions and activities increases students' retention of the material. This can lead to developing critical thinking skills, building confidence, and higher grades in exams.

Learning new material in an online course is more challenging for students because of information overload. Even when they are merely seated in front of a computer, prolonged durations of continuous screen staring mentally and physically drain the user. Many a times students are not able to connect to the topics that are taught in the class as they are unable to adapt themselves in this new way of learning. The study [18]studies prevalent lack of vocal engagement from the students in the online course.In this article we discuss the reasons for non-participation of students from view point of teachers. Table 2 lists the alternatives for this criterion.

Table 2.Criterion-1

Alternatives	**Criterion-1 :** Reasons why students DO NOT PARTICIPATE actively
A1	Your class is too early/late in the schedule
A2	There is clash in class timings with other classes they are taking
A3	They know that they have an Open Book Exam
A4	They log into class and then do not attend/ listen
A5	Technological glitches with platform/internet
A6	Lack of proper online teaching resources
A7	Students do not have required device and connectivity at their homes
A8	Students are exhausted with online teaching
A9	Students may be shy
A10	Students get bored

4.2.2. Criterion 2 – Obstacles in online Teaching

Despite numerous obstacles, educators persist in providing virtual support to their pupils. Online instructors have additional problems when teaching from home, despite the advantages of not having to drive and having greater flexibility. Developing relationships with faculty members and having in-person interaction with students are couple of these hurdles in an online learning environment.

Teachers and students converse promptly, easily, and constantly in a traditional classroom. This facilitates teachers' ability to identify when a pupil is having difficulty. Instead of being spontaneous and instantaneous, communication in a virtual classroom is frequently asynchronous and structured. These difficulties with online learning can be substantially increased by technical problems, such as spotty wi-fi or poor audio quality, which make it more difficult for teachers to comprehend and address their students' queries and worries. Table 3 shows different alternatives for the above criteria.

Table 3. Criterion-2

Alternatives	**Criterion-2 :** OBSTACLES faced in online teaching
A1	Students do not join the classes
A2	Students do not participate actively
A3	Lack of proper teaching resources
A4	Without their cameras on, it is difficult to check the student's response
A5	Evaluating students online is difficult
A6	OBE pattern for exams has made students disinterested in attending classes regularly
A7	Technological glitches with platform/internet
A8	Lack of proper pedagogy or skills required for online teaching

A9	Looking at the screen the whole day is tiring

4.2.3. Criterion3 – Experience in Online Teaching

The main benefits of online learning are that it provides a far more laid-back and adaptable atmosphere and encourages better time management and responsibility. Teachers faced challenges and learned innovations to create an atmosphere of closeness with students as if they were in the same classroom. There were problems, especially in the assessment and evaluation part. Table 4 lists the alternatives for the experience of teachers during online classes.

Table 4. Criterion-3

Alternatives	**Criterion-3 :** EXPERIENCE in online teaching
A1	"Is the online teaching-learning helping you feel connected as a group"?
A2	"Do you miss seeing your students in person"?
A3	"Do you look forward to these online teaching sessions"?
A4	"Is online teaching-learning helping you in maintaining your personal routine"?
A5	"Do you find these classes too much burden in these difficult times"?

4.3. Algorithm Used

Theframework of ranking the alternatives for each criterion by FTOPSIS uses the following algorithm:

Step1: Identify and Map Linguistic Alternatives to TFNs

Responses from the Google form response sheet for the relevant questions (hereby called alternatives) by each DM are extracted into Data Frames in a Python environment using Google Colab. All the responses of the DMs in terms of fuzzy linguistic variables are converted into "fuzzy numbers" as per Fig. 1, Fig. 2 and Table 1.

Step2:Construct a "fuzzy decision matrix" ($\widetilde{DF}$) for each criterion using linguistic values with m alternatives and nDMs as

DM1 ⋯DMn

$$\widetilde{DF} = \begin{bmatrix} \tilde{df}_{11} & \cdots & \tilde{df}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{df}_{m1} & \cdots & \tilde{df}_{mn} \end{bmatrix} = [\tilde{df}_{ij}]_{mxn}$$

Where$\tilde{df}_{ij}$ ∀i,j is a linguistic variable represented by a triangular fuzzy number provided by the jthDM for the ith alternative, denoted as $\tilde{df}_{ij}=(l_{ij},m_{ij}, n_{ij})$.

Step 3: Construct the "normalized fuzzy decision matrix" as

$$\widetilde{DF\_N} = \begin{bmatrix} \widetilde{df\_N}_{11} & \cdots & \widetilde{df\_N}_{1n} \\ \vdots & \ddots & \vdots \\ \widetilde{df\_N}_{m1} & \cdots & \widetilde{df\_N}_{mn} \end{bmatrix}$$

where $\widetilde{df_N}_{ij} = \left(\frac{l_{ij}}{n_j^*}, \frac{m_{ij}}{n_j^*}, \frac{n_{ij}}{n_j^*}\right)$with $n_j^* = \max_i\{n_{ij}\}$

Step 4: Determine the weights for each DM

The weights$\widetilde{DF_W}$are calculated using linguistic variables

$\widetilde{DF\_W}=[\widetilde{df\_w}_1,\widetilde{df\_w}_2,\cdots,\widetilde{df\_w}_n]$

where $\widetilde{df\_w}_j = (w_{j1},w_{j2},w_{j3})$ is a TFN with

$w_{j1}=\min_i\{l_{ij}\}$,

$w_{j2} = \frac{1}{n}\left(\sum_{i=1}^{m} m_{ij}\right)$,

$w_{j3} = \max_i\{n_{ij}\}$.

Step 5: Obtain the normalized "weighted matrix" $\tilde{\delta}$ as

$\tilde{\delta} = [\tilde{\delta}_{ij}]$ where $\tilde{\delta}_{ij} = \widetilde{df\_N}_{ij} * \widetilde{df\_w}_j = (p_{ij1}, p_{ij2}, p_{ij3})$

Step 6: Determining FPIS and FNIS

Let df_FPISanddf_FNISbe the FPIS and FNISrespectively.

$df\_FPIS = (p_1^+,\cdots, p_n^+)$

where $p_j^+ = \max_i\{p_{ij3}\};\ i = 1,2,\cdots,m;\ j = 1,2,\cdots,n$

$df\_FNIS = (p_1^-,p_2^-,\cdots, p_n^-)$

where $p_j^- = \min_i\{p_{ij1}\};\ i = 1,2,\cdots,m;\ j = 1,2,\cdots,n.$

Step 7: Determining the Euclidean distance of each alternative from df_FPIS and df_FNIS

The Euclidean distance from the ideal best (FPIS) for each alternative is calculated using equation (1) as

$d_i^+ = \sum_{j=1}^{n} d(\tilde{\delta}_{ij}, df\_FPIS) \quad \forall i = 1, \dots, m$

The Euclidean distance of each alternative from the ideal worst (FNIS) is calculated using equation (1) as

$d_i^- = \sum_{j=1}^{n} d(\tilde{\delta}_{ij}, df\_FNIS) \quad \forall i = 1, \dots, m$

Step 8: Determining the scores

Corresponding to each alternative calculate the score which represents the closeness coefficient as:

$df\_cc_i = \frac{d_i^-}{d_i^+ + d_i^-}$.

Step 9:Ranking the alternatives

Lastly sort the above score in descending order to rank the alternatives.

5. RESULTS AND DISCUSSION

Tables 5, 6, and 7 display the outcomes that were achieved by applying the algorithm to the criteria in Tables 2, 3, and 4. Based on our findings, students' exhaustion with online instruction is the primary cause of their non-engagement in an online course. Many internet-related technical issues prevent them from participating in the online course. Most students simply log in to the class; they do not even bother to participate or pay attention. The main challenge experienced by students taking online classes according to the teachers is eye fatigue from constant looking at the screen. It is also challenging to monitor student performance and participation in class because there are no cameras. The professors likewise long to interact with their students face-to-face. Nonetheless, most of them believe that learning from home is inhibiting a sense of community and belonging.

Table 5. Ranks Of Alternatives For Criterion-1

Criterion-1: Reasons for non active participation of students	**FPIS**	**FNIS**	**CC**	**RANK**
Students are exhausted with online teaching	2181.8455	1840.8514	0.4576	1
Technological glitches with platform/internet	2188.2443	1845.7520	0.4575	2
They log into class and then do not attend/ listen	2193.1822	1821.1848	0.4537	3
Students do not have required device and connectivity at their homes	2207.5114	1800.6572	0.4492	4
They know that they have an Open Book Exam	2259.5839	1708.6330	0.4306	5
Students get bored	2268.4903	1688.1678	0.4267	6
Lack of proper online teaching resources	2317.9153	1601.0392	0.4085	7
Students may be shy	2374.8215	1503.6524	0.3877	8
Your class is too early/late in the schedule	2511.1482	1263.8187	0.3348	9
There is clash in class timings with other classes they are taking	2525.3645	1241.8441	0.3296	10

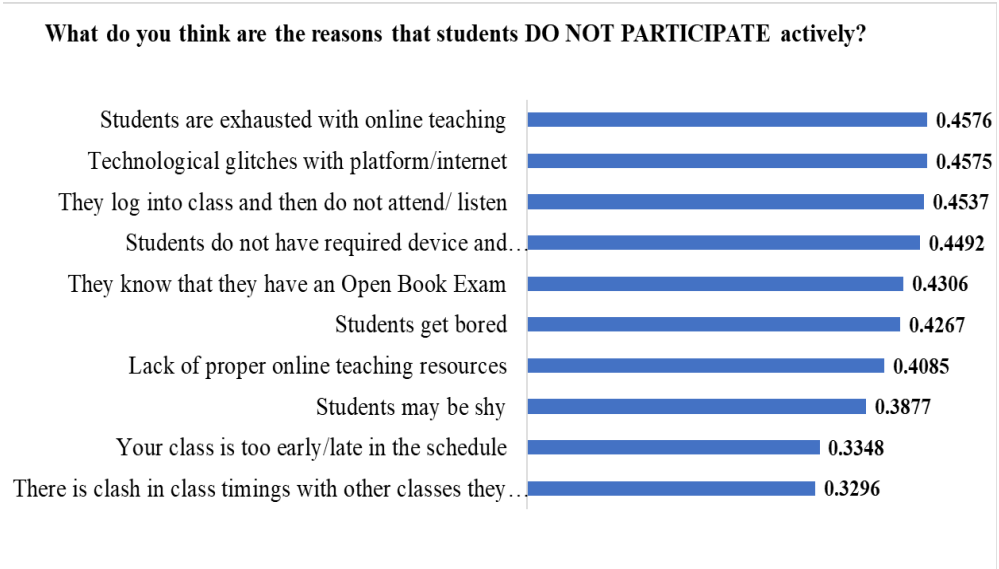

Fig 3. Ranks of alternatives for Criterion-1

Table 6. Ranks Of Alternatives For Criterion-2

Criterion-2: Obstaclesin online teaching	**FPIS**	**FNIS**	**CC**	**RANK**
Looking at the screen the whole day is tiring	2025.8881	1974.5906	0.4936	1
Without their cameras on, it is difficult to check the student's response	2037.9493	1957.0223	0.4899	2
Evaluating students online is difficult	2086.5418	1876.7706	0.4735	3
Technological glitches with platform/internet	2097.2053	1872.0169	0.4716	4
OBE pattern for exams has made students disinterested in attending classes regularly	2118.4115	1837.4369	0.4645	5
Students do not participate actively	2121.0571	1825.6828	0.4626	6
Students do not join the classes	2228.0603	1648.7501	0.4253	7
Lack of proper pedagogy or skills required for online teaching	2249.0594	1605.4888	0.4165	8
Lack of proper teaching resources	2288.2276	1533.8825	0.4013	9

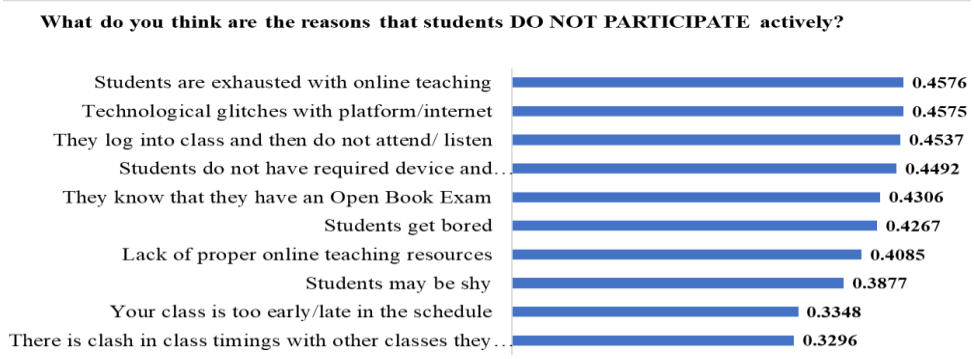

Fig 4. Ranks of alternatives for Criterion-2

Table 7. Ranks Of Alternatives For Criterion-3

Criterion-3: Experience in online teaching	**FPIS**	**FNIS**	**CC**	**RANK**
"Do you miss seeing your students in person"?	2146.7606	2165.6250	0.5022	1
"Is the online teaching-learning helping you feel connected as a group"?	2380.8782	1778.5602	0.4276	2
"Is online teaching-learning helping you in maintaining your personal routine"?	2451.4730	1657.2494	0.4033	3
"Do you find these classes too much burden in these difficult times"?	2468.8492	1627.3429	0.3973	4
"Do you look forward to these online teaching sessions"?	2471.4396	1612.5773	0.3949	5

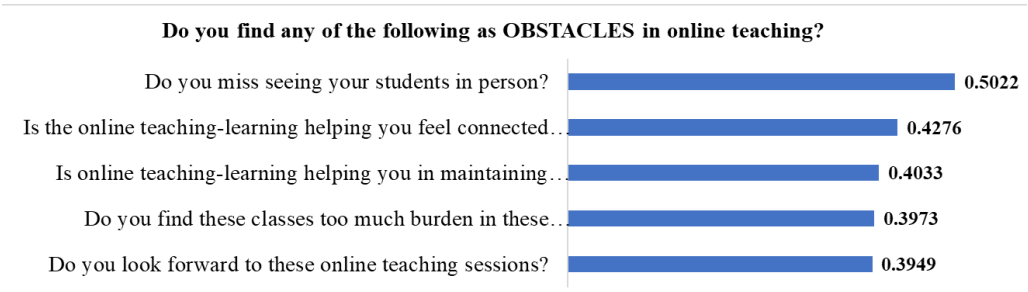

Fig 5. Ranks of alternatives for Criterion-3

6. CONCLUSION

In the Indian setting, online education is very important for several reasons. It helps students who might not have access to high-quality institutions by bridging the gap between urban and rural locations and by making accessible educational resources at a click of a button. In a nation where there are wide regional

and socio-economic differences, this is vital. A greater proportion of the population can easily afford online education since it saves money on transportation, lodging, and printed textbooks. It offers great flexibility and freedom to study at one's own time and pace, which is quite helpful for working adults and students who have a lot on their plates. Many courses and specialties that are offered online might not be available locally. The diversity in courses offered online, enables learners to acquire skills pertinent to modern job markets. Online education has become an even more crucial alternative to traditional classroom-based learning in India post-pandemic. The NEP 2020 also promotes online education. Enrolment in online courses is increasing significantly day by day. This study has helped to identify optimal responses related to student non-participation, challenges faced, and teachers' overall experiences with online learning using fuzzy logic. Employing FTOPSIS, the proposed method effectively addresses human judgment and responses uncertainty based on questionnaire data. Our findings indicate that the most frequent issue observed among students is exhaustion from prolonged screen exposure. Additionally, teachers find it challenging to monitor student participation and performance in an online setting. We intend to carry out a similar study in the future, focusing on responses from the students' perspective.

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