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Analysis of English Language Training for Engineering Students in India Using Fuzzy TOPSIS Method

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Abstract. This essay investigates the efficacy of English language instruction provided in Indian engineering institutes. In India, a large number of engineering graduates are jobless as a result of their weak communication abilities and lack of confidence. Numerous research publications have emphasized the need to improve the employability of engineering graduates, yet the issue of inadequate communication skills in India continues to worsen. The primary goal of this study is to comprehend the realities of English classrooms in engineering colleges in order to solve the puzzle of why so many Indian engineering graduates perform poorly. The on-campus placements during their final year studies nevertheless cause a lot of third-year students to feel uneasy. Additionally, it has been shown that teachers' methods need to be modified because many students prefer more engaging sessions to help improve their language abilities. Survey results highlighted the significance of suitable training programs for engineering students by demonstrating a discrepancy between English instructors' confidence levels and the confidence levels of engineering students. On the LSRW (Listening, Speaking, Reading, Writing) skills scale, participation in group discussions received the highest value, while the lowest value was observed for trained abilities to participate in group discussions. Communication abilities are crucial in an engineering environment and cannot be overstated. Good job opportunities are easily available to many urban students with good communication skills. However, rural students face a job nightmare due to their lack of communication skills. This paper describes an experiment that aimed to improve competence with the help of a 45-hour communication skills course at a rural engineering college. The overall communication skills of the students in the course showed statistically significant improvement in sentence structure, vocabulary, volume, pronunciation, and group discussion, as assessed by self and peer assessment. Rural engineering students should be provided with opportunities to practice and learn interpersonal communication skills during their academic courses. Exploring the relationships between their comfort levels and therapy among engineering students in Saudi Arabia, cultural competence and communication skills were assessed using a web-based survey, and overall preparedness was evaluated by the researchers. Significant correlations were found between communication skills and the relationship with patients, as well as comfort ratings of medical conditions. Overall, students' responses reflected inadequate knowledge and treatment of Saudi Arabian patients, and some expressed discomfort. Language proficiency with Saudi Arabian patients and clinical experience were associated with comfort in dealing with Saudi Arabian patients. These findings suggest the ability to improve patient care among medical and engineering students in Saudi Arabia. Providing opportunities and training for cultural immersion that focuses on communication with Saudi patients may prevent the development of unsatisfactory relationships. The main factors used to analyze the communication skills of engineering students are sentence construction, eye contact, presentation skills, content knowledge, voice, pronunciation, and vocabulary.

Key Words: English language training for engineering students in India, Fuzzy TOPSIS Method

1. Introduction

For many years, English has been an essential component of the Indian academic programs, crucial for landing jobs at reputable businesses. English became a second language for many educated Indians as British colonialism united India and introduced the English language. Additionally, it has evolved into a connecting language for educated Indians, while diverse languages are spoken in every state of the nation. Many educated Indians learned English when it was made the official language of administration in the 1700s because it allowed them to advance in their careers. Even after India gained independence in 1947, English continued to have a significant influence. The English language is now widely used in the management of both private and public institutions, as well as in higher education and the media. In India, English is now a potent force for change. Both communication and English skills pose major problems in Saudi Arabia, especially in its rural areas. Studying in rural colleges severely affects youth employability. Saudi Arabia's growing population and increasing life expectancy are creating more opportunities in the healthcare sector. While nursing programs are offered in urban areas, health programs like nursing are not readily available in rural areas. These rural students have poor communication skills. Therefore, to remedy the situation, many medical colleges have hired communication skills trainers on a full-time basis. The experiment described in the study was conducted in a remote college. In today's society, the fact that English is a universal language refers to how universally it is compared to other languages, as it has reached a pedestal. Therefore, the more skilled and competent one becomes, the more demanding and challenging it is to be a language user. As English as a Second Language (ESL) teachers in Saudi Arabia, they face countless challenges in developing primary ESL learners' language

skills, especially when it comes to writing. Some of the problems include vocabulary, lack of motivation, illiteracy, and multimedia language influence. As a result, ESL teachers can improve primary ESL learners' writing skills by utilizing a variety of strategies and approaches, especially focusing on simple sentence structure. Therefore, this study uses the PowerPoint picture-word card technique to develop ESL learners' use of simple sentence structures. Bubble charts provide a literature review that explores nursing students' English presentation skills and strategies to develop their abilities. A cross-sectional investigation was carried out among engineering college students studying English for Nursing. Developing presentation skills within foreign language classes encourages students to express themselves coherently, logically, confidently, creatively, and in an organized manner. It is proposed that these two levels be built on experience and that students practice public speaking without relying heavily on technology. Low-ability students often use computers as tools to transform their work, reading information from slides, hiding behind them, and reading explanations under charts. Autistic students face learning difficulties such as difficulty concentrating, memorizing vocabulary, low confidence, poor eye communication, inability to communicate well with others, difficulty understanding complex sentences, and communication difficulties. Limited English proficiency in Saudi Arabia is associated with poorer outcomes, lower patient safety due to medical errors and misdiagnosis, longer hospital stays, and decreased patient satisfaction with care. Misdiagnosis leads to more testing, poor patient compliance, and preventive care issues for patients in Saudi Arabia, resulting in rising healthcare expenses for hospitals, providers, and payers. In a panel on English language competence and clinical communication skills for third-year engineering students at an SRM University, it was found that Arabic-speaking patients had lower costs in an inpatient environment with a language-proficient provider than language-proficient patients without a provider. On the LSRW (Listening, Speaking, Reading, Writing) skills scale, the highest value was trained to participate in group discussions, while the lowest value was observed for writing skills.

2. English language training for engineering students in India

In the majority of Indian private universities, English is taught for the first two semesters of engineering. The main goal of this course is to improve students' communication abilities across all four skill areas (LSRW). The courses are instructed by M.Phil. or Ph.D.-qualified instructors, most of whom hold master's degrees in English literature. However, our research shows that the methods used in Indian engineering institutes for teaching the English language have significant inadequacies. Many teachers lack sufficient knowledge of ESP or English for Employment. Additionally, students in India lack the necessary training to handle the recruitment procedures of global corporations. Engineering students believe that English lessons should be more engaging and interactive, rather than relying on passive teaching strategies that are teacher-centered. The curriculum needs to involve more participatory exercises to improve and hone students' communication abilities. Engaging lessons in the classroom encourage learners to become active communicators (Matura Gagarin, 2004). English professors should receive explicit training in communicative language instruction. This training should address the difficulties that professionals in various fields face. Without motivated English teachers who strive to bridge the gap between higher education and the workforce, curriculum modifications alone will not result in the necessary adjustments. Furthermore, teaching English grammar in isolation does not seem to help engineering students understand the value of grammatical structures. Instructors should bring grammar lessons to life, pique students' interest in the material, and raise awareness by providing students with incentives to learn engineering and opportunities to use grammar in practical settings (Bayard Pekoe, 2008). It is important to make an effort to apply grammar in professional settings in order to capture learners' attention and emphasize the importance of knowing grammar. Conducting an English for Specific Purposes (ESP) needs assessment is essential to understand learners' requirements and expectations. This assessment will help create a stimulating learning atmosphere and improve employability skills, as the goal of English training is to enhance students' job prospects. English teachers should provide a plethora of information for students from newspaper articles and websites in order to increase awareness of the importance of language skills in job interviews and workplace activities. Teachers must read and share information about language, as kids desire to learn more about careers. Companies require certain skills. Innovative training techniques should be incorporated into classes to improve confidence, as many students lack confidence in their presentation skills. Engineering graduates would undoubtedly benefit from watching videos of excellent communicators and leaders, as well as participating in organized training sessions to share ideas confidently and effectively. More precisely, for poorer and low self-confidence students, motivation and individual coaching sessions should be provided by colleges that have acquired English language proficiency, so they don't feel inferior in front of their friends. Nation (2000) asserts that teachers can use their professional knowledge to facilitate student experience sharing. While preparing students for communicative tasks, teachers should teach oral strategies and abilities. Furthermore, it is preferred that teachers provide oral assignments with graded difficulty levels based on their students' communication proficiency. Students can readily exercise their abilities with confidence if simple tasks with clear directions are offered in class, and the level of difficulty can be increased as students' self-assurance levels grow. Many students believe that assessments based on theoretical papers should be eliminated, and that communicative activities like individual presentations and group discussions should be used to evaluate students instead. The study committee, English teachers, and business professionals ought to collaborate to create a curriculum that meets the demands of the moment, enabling business professionals and English academics to sharpen and refocus their English skills in order to secure employment.

3. MCDM is Fuzzy TOPSIS

Result of normalizing the matrix: Positive best solution and matrix normalization; Calculation of Positive ideal solution and negative ideal solution separations alternative from PIS and NIS. Proximity in descending order to obtain substitution. The TOPSIS method has proposed a number of solutions for solving criterion decision problems. According to this technique, the best alternative is closer to a positive ideal solution and far from a negative one. The scope of the present work is to investigate the optimal operating conditions of a cooling tower, operated using an established method at a specific location, focusing on thermal performance CFWCT and MCDM-TOPSIS. Heat and mass were provided in the CFWCT exchange equations, and the thermal efficiency of the CFWCT was evaluated with fill height. These MCDM techniques are frequently applied conservatively, resulting in approximations of unsatisfactory solutions. Design of experiments and topic methods are therefore covered in this study to create regression meta-models that look for the best parameter settings for the EDM and WEDM NTM processes using the computed TOPSIS scores. Create regression meta-models using the calculated TOPSIS scores to look for the best parameter settings for the EDM and WEDM NDM processes. A comprehensive weight is calculated between two probability distributions using relative entropy. Based on the calculated comprehensive weights, air quality measurement is evaluated using the TOPSIS system, which has wide excellence in applications and multi-attribute decision-making models. In this manner, evaluated attributes are replaced, and every problem becomes a geometric system of n-dimensional space with points. Fuzzy topics and network optimization techniques are applied in the deep multiple or body placement problem selection of shaft location based on the TOPSIS system. Highway superstructure selection in the conceptual design of a bridge is also considered as an optimization-based method for their solution. Measured impacts using the TOPSIS method and water level in combination with qualitative and weighted value sets of objective and subjective values. The SCR is estimated using the Fuzzy TOPSIS technique. The common TOPSIS method of SCR estimation is limited in handling ambiguity or imprecision of estimation, so the Fuzzy-TOPSIS method is adopted. Linguistic terms and criteria are used to assess risk factor ratings and weights. An optimization method is proposed for determining the extended TOPSIS weight information model under a neutrosophic set with unknown weights, time measurements, and unknown weights. The TOPSIS approach is employed to choose the best option that meets the specified requirements. Options from numerous alternatives are examined, and the best option is chosen based on the ranking of compromise. Spatial-temporal CV-TOPSIS method for flood characteristics disaster risk assessment. In the first part, each year was considered as an observer for the economy, and 263 observations of flood risk were analyzed using the CVTOPSIS method to obtain scores. The study aims to evaluate distance performance using the DEA method in the academic year of academic departments of public universities in Turkey using the TOPSIS method. This results in efficient decision making. The study compares and ranks the units. The software establishes the weights for the chosen variables using the AHP approach, candidate's criteria final ranking technologies, and hierarchy. TOPSIS is a known classical MCDM method for optimal solution that uses the order efficiency technique by similarity. The chosen alternative is the positive ideal, while the negative ideal is the shortest distance from the solution. The idea is to stay away from the other side-based solution. According to the TOPSIS method, the observed selective hybridization results in generally very high rankings of different methods in the models. On the other hand, M5T hybrid LSSVM, ANFIS, MLP, RBF, and GEP models outperform. The alternatives A will be chosen based on the LSRW skills. The highest value is trained to participate in group discussion, while the lowest value is sharpened.

TABLE 2. English language training for engineering students

	Agree/Strongly agree%	Disagree/Strongly %	Indecisive (%)
Learnt new language skills	35.61	38.25	23.33
Confident to face job interviews	33.88	29.36	25.58
Trained to participate in group discussion	38.42	20.54	27.21
Improved my presentation skills	36.52	35.69	29.16
Got sufficient opportunities to practice language and methodologies were student centered.	37.25	49.27	23.69
LSRW skills were sharpened	35.66	44.58	34.32

Table 1shows theEnglish language training for engineering students in Indiain Fuzzy TOPSIS method on the Learnt new language skills, Confident to face job interviews, trained to participate in group discussion, improved my presentation skills, got sufficient opportunities to practice language and methodologies were student centered, LSRW skills were sharpened data set**.**

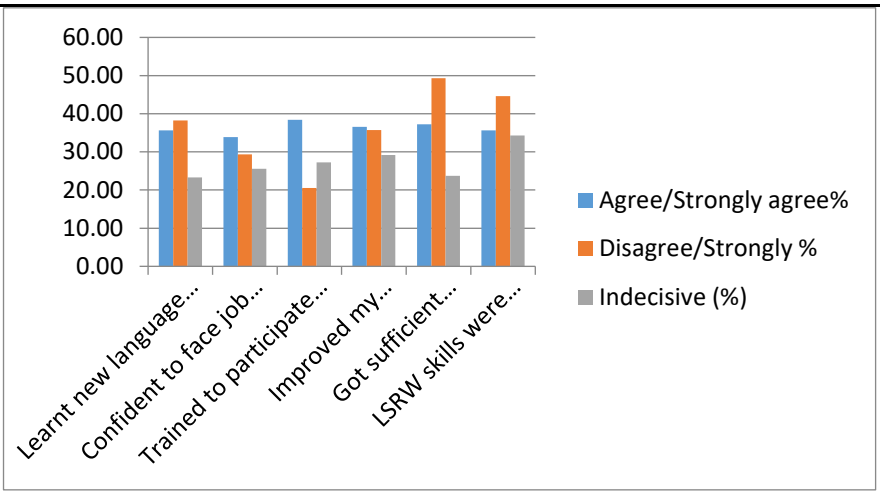

FIGURE 1. English language training for engineering students

Figure1 shows the English language training for engineering students in India in Fuzzy TOPSIS method on the Learnt new language skills, Confident to face job interviews, trained to participate in group discussion, improved my presentation skills, got sufficient opportunities to practice language and methodologies were student centered, LSRW skills were sharpened data set**.**

TABLE 2. Squire Rote of matrix value

1268.0721	1463.0625	544.2889
1147.8544	862.0096	654.3364
1476.0964	421.8916	740.3841
1333.7104	1273.7761	850.3056
1387.5625	2427.5329	561.2161
1271.6356	1987.3764	1177.8624

Table 2 shows the Squire Rote of matrix value.

TABLE 3. Normalized Data

Normalized Data		
0.4010	0.4165	0.3467
0.3815	0.3197	0.3801
0.4327	0.2236	0.4043
0.4113	0.3886	0.4333
0.4195	0.5364	0.3520
0.4016	0.4854	0.5100

Table 3 showstheEnglish language training for engineering students in Indiain Fuzzy TOPSIS method on the Learnt new language skills, Confident to face job interviews, trained to participate in group discussion, improved my presentation skills, got sufficient opportunities to practice language and methodologies were student centered, LSRW skills were sharpened Normalized Data.

TABLE 4. weight

Weight		
0.25	0.25	0.25
0.25	0.25	0.25
0.25	0.25	0.25
0.25	0.25	0.25
0.25	0.25	0.25
0.25	0.25	0.25

Table 4 shows the Weight ages used for the analysis. We have taken same weights for all the parameters for the analysis**.**

TABLE5. weighted normalized decision matrix

Weighted normalized decision matrix		
0.1003	0.1041	0.0867
0.0954	0.0799	0.0950
0.1082	0.0559	0.1011
0.1028	0.0971	0.1083
0.1049	0.1341	0.0880
0.1004	0.1213	0.1275

Table.5 shows the weighted normalized decision matrix

TABLE 6. Positive Matrix

Positive Matrix		
0.1082	0.1341	0.1275
0.1082	0.1341	0.1275
0.1082	0.1341	0.1275
0.1082	0.1341	0.1275
0.1082	0.1341	0.1275
0.1082	0.1341	0.1275

Table 6 shows the Using the selected Linguistic evaluations of decision makers Convert to quantitative values fuzzy number positive matrix**.**

TABLE 7. Negative matrix

Negative matrix		
0.0954	0.0559	0.1275
0.0954	0.0559	0.1275
0.0954	0.0559	0.1275
0.0954	0.0559	0.1275
0.0954	0.0559	0.1275
0.0954	0.0559	0.1275

Table 7 shows the Calculate aggregated Negative matrix

TABLE 8.SI Plus & SI Negative

	SI Plus	**SI Negative**
Learnt new language skills	0.0513	0.0634
Confident to face job interviews	0.0645	0.0404
Trained to participate in group discussion	0.0825	0.0293
Improved my presentation skills	0.0420	0.0461
Got sufficient opportunities to practice language and methodologies were student centered.	0.0396	0.0881
LSRW skills were sharpened	0.0149	0.0656

Table 8 shows the English language training for engineering students in India in Fuzzy TOPSIS method on the Learnt new language skills, Confident to face job interviews, trained to participate in group discussion, improved my presentation skills, got sufficient opportunities to practice language and methodologies were student centered, LSRW skills were sharpened SI Plus & SI Negative.

TABLE 9. Ci

	Ci
Learnt new language skills	0.5527
Confident to face job interviews	0.3852
Trained to participate in group discussion	0.2623
Improved my presentation skills	0.5233
Got sufficient opportunities to practice language and methodologies were student centered.	0.6898
LSRW skills were sharpened	0.8145

Table 9 showsthe English language training for engineering students in India in Fuzzy TOPSIS method on the Learnt new language skills, Confident to face job interviews, trained to participate in group discussion, improved my presentation skills, got sufficient opportunities to practice language and methodologies were student centered, LSRW skills were sharpened Ci

TABLE 10. Rank

Rank	
Learnt new language skills	**3**
Confident to face job interviews	**5**
Trained to participate in group discussion	**6**
Improved my presentation skills	**4**
Got sufficient opportunities to practice language and methodologies were student centered.	**2**
LSRW skills were sharpened	**1**

Table 10 shows the final result of this paper the Learnt new language skills third rank, Confident to face job interviews fifth rank, trained to participate in group discussion sixth rank, improved my presentation skills forth rank, got sufficient opportunities to practice language and methodologies were student centered second rank, LSRW skills were sharpened first rank.

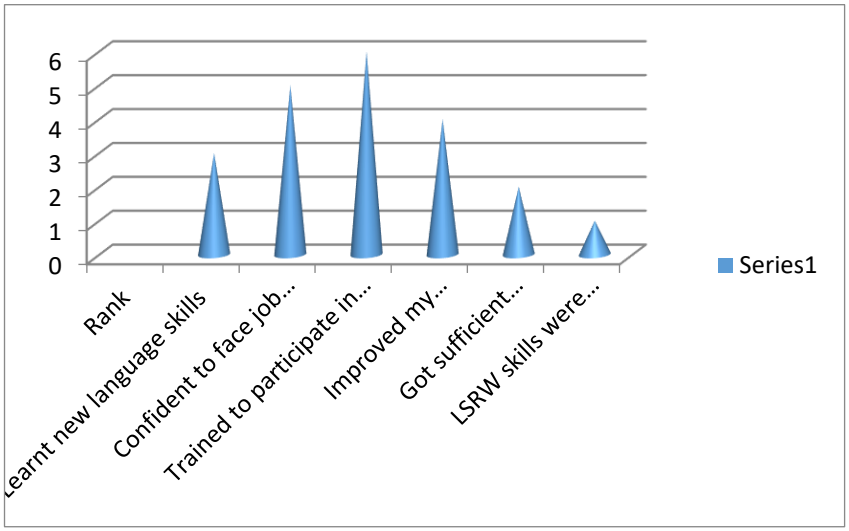

FIGURE 2. Rank

Figure. 2 shows the final result of this paper the Learnt new language skills third rank, Confident to face job interviews fifth rank, trained to participate in group discussion sixth rank, improved my presentation skills forth rank, got sufficient opportunities to practice language and methodologies were student centered second rank, LSRW skills were sharpened first rank.

4. Conclusion

This paper investigates the efficacy of English language instruction provided in Indian engineering institutes. India has a large number of unemployed engineering graduates due to their inability to communicate effectively and lack of confidence. Many research articles have emphasized the significance of optimizing employability for engineering graduates. However, the problem of poor communication skills continues to grow in India. The primary goal of this study is to comprehend the realities of English classrooms in engineering colleges in order to solve the puzzle of why so many Indian engineering graduates perform poorly. Many third-year students find themselves feeling insecure about campus placements, which occur throughout their final academic year. Furthermore, it was discovered that teaching techniques need to be enhanced, as many students want their language abilities to be improved through more engaging sessions. Results of the survey revealed a gap between engineering students' levels of confidence and the teaching style of English instructors. The study also emphasized the importance of appropriate training projects for engineering students, which were measured using the TOPSIS method and a combination of qualitative and weighted value sets of objective and subjective values [10]. SCR (Student Classroom Ratio) is estimated using the Fuzzy TOPSIS technique. The common TOPSIS method of SCR estimation has a linguistic limitation in handling ambiguity or imprecision of estimation. To overcome this limitation, the Fuzzy-TOPSIS method is adopted, where linguistic terms and criteria are used to assess risk factor ratings and weights. On the LSRW (Listening, Speaking, Reading, and Writing) skills scale, the highest value indicates well-trained participation in group discussions, while the lowest value indicates a need for improvement.

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