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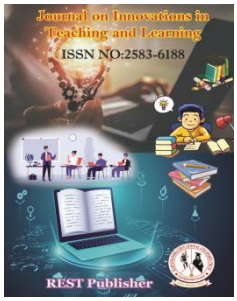

Assessment of Effective Teaching Using by TOPSIS method

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Abstract: *Effective teaching is a fundamental component of quality education. Educational institutions and stakeholders are constantly seeking ways to assess and enhance teaching practices to ensure optimal learning outcomes for students. This paper provides an overview of the various approaches and methods used for assessing effective teaching. It delves into the significance of aligning assessment strategies with specific learning goals and discusses the importance of considering both quantitative and qualitative measures. The paper highlights the role of student feedback in evaluating teaching effectiveness. It explores the use of surveys and evaluations to gather insights into instructional methods, classroom management, and the overall learning experience. Additionally, the incorporation of peer evaluations and self-assessment by instructors is examined as valuable tools for comprehensive teaching assessment. Furthermore, the paper addresses the growing influence of technology in teaching assessment. The utilization of learning analytics and data-driven insights offers a new dimension to evaluating teaching effectiveness. This includes the analysis of student performance data, engagement metrics, and online interaction patterns. It involves evaluating and understanding the various factors that contribute to effective teaching and its impact on student learning outcomes. Student Learning Outcomes: Effective teaching directly influences student learning outcomes. Research in this area helps identify teaching practices that lead to improved academic achievement, critical thinking skills, problem-solving abilities, and overall educational success. Educational Quality: High-quality teaching is a cornerstone of a strong education system. Understanding what makes teaching effective enables educational institutions to provide a better learning experience, attract and retain skilled educators, and enhance their reputation for producing successful graduates. TOPSIS, This method involves evaluating the geometric distance between each alternative solution and two reference solutions: the positive ideal solution and the negative ideal solution. The underlying principle of TOPSIS assumes that the criteria being assessed are of an ascending nature, where larger values represent better performance. To account for disparate dimensions or scales among the criteria, normalization is often employed within the TOPSIS framework.* Alternative taken as Student Evaluations, Peer Reviews, Self-Assessment, Classroom Observations Evaluation preference taken as *Enhanced Learning Outcomes, Continuous Improvement, Subjective Bias, Time-Consuming. From the result Student performance data is got the first rank and classroom observation is having the lowest rank.*

Keywords: *effective teaching, reflective dispositions, teacher candidate, adaptability; teachers; workplace outcomes; effective teaching*

1. INTRODUCTION

Assessment involves the comprehensive evaluation of a task throughout its various stages. As described by Suskie (2018), it forms a structured basis for developing concepts, assumptions, inferences, and knowledge related to learning. In the context of education, instructors consistently assess their students to showcase the advancement of their learning using methods such as tests, assignments, quizzes, verbal presentations, laboratory demonstrations, conversations, debates, interviews, written reports, projects, journals, term papers, essays, open-book assessments, teacher observations, documentation, in-class tests, collaborative projects, Kahoot-based interactive quizzes, and brainstorming sessions (Hedgcock & Ferris, 2013).According to Earl (2013), assessment can assume various forms, including traditional and performance-based approaches, direct and indirect testing, objective and subjective measures, as well as quantitative and qualitative evaluations. Among these, formative assessment emerges as the most advantageous due to its numerous benefits, such as increased learner engagement, integration of multiple sources of information, incorporation of blended learning techniques,

reflective practice, self-assessment, clear objectives, multiple feedback loops, and diverse communication channels (Terblanche, 2017). Formative assessment stands out as the preferred method as it offers practicality and effectiveness. This approach enables educators to adjust their teaching strategies to better captivate students and assess their emotional development, encompassing attitudes, values, and interpersonal behaviors (Ruiz-Primo, 2011). Employing this assessment strategy, instructors can swiftly gauge students' listening, speaking, and reading proficiencies and provide necessary corrective guidance (Price, Handley, Millar, & O'Donovan, 2010).Collaborating with peers and teachers, learners become self-regulated and autonomous, assuming responsibility for their own education. [1]Pre service educators participated in the (VAIL), an assessment based on videos that evaluates how well teachers understand effective teaching methods and behaviors. To identify trends and potential predictors at both individual and program levels, researchers conducted descriptive and regression analyses. The study's outcomes indicate that a standardized test, previously administered to practicing educators, can be integrated into teacher training. The analysis illustrates differences in pre service teachers' ability to recognize effective teaching techniques, influenced in part by features of their teacher education program. The study also explores the feasibility of implementing a shared, video-based teaching assessment across all teacher education programs to gauge pre service teachers' proficiency in identifying strong teaching methods. The focus of the research was on the Video Assessment of Interactions and Learning (VAIL, 2010), a standardized evaluation that had proven successful with a significant sample of active instructors .The VAIL could be seen as a viable option in the United States, especially considering the need for various indicators of pre service teacher development to accredit teacher education programs (NCATE, 2008).The objectives of pedagogical research encompass both proficient teaching and optimal student learning, which align with the cognitive framework to be discussed later. To elaborate on these objectives, let's begin with the notion of effective teaching. This notion involves considering the diverse student body under our tutelage. Among our students, there are those who approach the subject with genuine enthusiasm and possess a firm grasp of the material. Conversely, some enroll due to scheduling convenience or practical necessity, lacking foundational knowledge and possibly holding misconceptions about the subject. Motivation and effort vary, ranging from determined dedication to a desire to merely pass the course.In this spectrum, certain students are predisposed to learn regardless of the instructor, whereas others pose a more intricate teaching challenge. For students who exhibit intelligence and zeal, an instructor's competence is crucial. However, the essence of successful teaching extends further. It encompasses the task of reaching out to the less informed and less motivated learners, striving to convert them into engaged, knowledgeable enthusiasts of the discipline. Creating an environment where learning is esteemed by students and achievable with persistent endeavor constitutes a pivotal aspect of effective teaching.Though it might be alluring to evaluate the effectiveness of our teaching solely based on the readiness of students to learn from any source, a substantial body of pedagogical research underscores that adept educators can reach a substantially larger number of students by acquainting them with fundamental principles of learning. [3] NSES; [NRC], present a vision for effective science teaching where students are actively engaged in the process of learning science, rather than being passive recipients (p. 2).Over the last decade, the standards, developed collaboratively by teachers, scientists, and science educators (NRC, 1996), have guided efforts to transform science education. Most states have adapted their own standards to align with the goals and content of the NSES. Alongside subject matter standards, certain states have integrated requirements for teaching scientific inquiry, using technological innovation, and instilling scientific ways of thinking.Students are encouraged to participate in various scientific activities like describing phenomena, posing inquiries, constructing explanations, evaluating these explanations against established scientific knowledge, and conveying their thoughts to others. These activities are fundamental components of standards-based science instruction, referred to as effective science teaching in this study (NRC, 1996). The NSES provides comprehensive guidance on the necessary shifts for delivering successful education. Notably, effective instruction entails a shift from superficially covering numerous topics to delving deeply into fewer topics, focusing on inquiry rather than rote memorization [4]. The aim was to provide comparative insights into leadership, the teaching and learning environment, participant preparation, professional development, and feedback processes in various schools. This article presents the primary findings of this survey. As the reports solely reflect the instructors' viewpoint on school occurrences, it's logical to consider this perspective alongside other data sources. The teachers' perspective holds significance as well. Effective implementation of even the finest policies and practices depends on actual application, and the educational system's quality hinges on the competence and efforts of its educators [5].Efficient living and effective teaching both necessitate the ability to view situations from the perspectives of others. Particularly for inexperienced or young educators, understanding how their students perceive and receive their teaching presents a significant challenge (Berliner, 1986). Instructors of college-level education courses play a crucial role in imparting successful teaching techniques and classroom management skills to aspiring teachers. Moreover, teacher training programs encounter challenges in establishing a standard against which students can evaluate their progress. In the context of its influence on student learning, self-analysis is regarded by public school music teachers as a pivotal teaching attribute.Research indicates that undergraduate students who engage in self-evaluation of their teaching recordings tend to be subjective rather than objective in their assessments. They

often rate their teaching behaviors higher than their instructors do (Cassidy, 1990; Greenfield, 1980). The question of whether involving an experienced teacher's input in self-observation enhances accuracy remains inconclusive. While later studies by Carnine and Fink (1978), Horton (1975), and Saudergas (1972) revealed the efficacy of similar approaches, Rule (1972) found such a method to be ineffective. However, Saudergas argued that establishing behavioral standards before teaching might be more effective in modifying behavior than delivering feedback after a teaching episode.[6]Effective instruction was linked to a thoughtful approach to teaching, particularly in the domains of how lessons are conducted, the arrangement of the classroom environment, and the expectations teachers hold. The study utilized data encompassing scores related to educators' reflective tendencies, which were assigned to teacher candidates (totaling 55 individuals). Additionally, the study considered evaluations of proficient teaching given by supervising educators. The concept of reflective disposition was composed of six key aspects: contemplation on the requisite knowledge and skills for teachers, introspection on teaching practices, consideration of learning dynamics, and assessment of the interplay between teaching and learning, and contemplation on the practicality of assuming a teaching role within a classroom setting. On the other hand, the notion of effective teaching comprised five components: effective classroom management, adept instructional strategies, skillful organization of classroom space, and instructor outlooks and anticipations. [7]The distinctive element of educational work lies in its consistent engagement with novelty, modification, and unpredictability, setting it apart from other pursuits. The ability to adeptly navigate through these fluctuations is referred to as adaptability. This article explores the pivotal role of adaptability in ensuring the effective and efficient performance of teachers' roles.In order to enhance educators' adaptability and foster advancements in this crucial realm. Educational Engagement with Cultural Diversity in Teaching: This segment centers on the central theme of the study, focusing on teachers acquiring the knowledge and skills essential for effectively engaging with students from diverse cultural backgrounds. Grasping and addressing the specific needs, perspectives, and experiences of students from varying cultures constitute pivotal aspects of teaching in a culturally diverse environment. Observing Shifts in Aspiring Teachers' Perspectives: This conveys the study's objective of observing and documenting the evolution of thoughts, beliefs, and attitudes in individuals aspiring to become teachers. These individuals, termed "pre service teachers," are still in the process of becoming fully qualified educators. Exploring Effective Teaching: This section explicitly states that the study is centered around the concept of effective teaching. Within the context of instructing students from diverse cultural backgrounds, it delves into the essence of being a proficient educator. This encompasses instructional techniques, tactics, and strategies that prove particularly efficacious in classrooms with a diverse student population. In essence, the phrase suggests that the study is concerned with tracking the evolution of perspectives and notions in individuals undergoing teacher training, particularly in terms of what constitutes effective teaching when faced with the challenge of educating students from varying cultural backgrounds. To investigate the evolution of these pre service teachers' attitudes and approaches as they develop a deeper understanding of effectively instructing culturally diverse learners, the study will likely involve research, data collection, and analysis. [9] Both the realms of art and science play essential roles in facilitating effective instruction. Skillful educators use a blend of social, behavioral, and intellectual elements to craft a distinctive educational experience within the classroom. Clearly, the complexity of creating an optimal learning setting cannot be fully addressed within a single piece. Nevertheless, a combination of research, hands-on application, and accumulated wisdom has shed light on crucially significant teaching methodologies, especially when engaging with challenging students. Within this piece, we delineate precise approaches that instructors can employ to build and uphold a favorable learning atmosphere. Furthermore, we structure tangible and effective teaching practices into a comprehensive framework.[10]Differentiated instruction refers to the adaptation of teaching methods, lessons, and materials to accommodate the specific needs and learning preferences of individual students. Its primary objective is to ensure that all students can access engaging and appropriately challenging learning experiences. An approach called flexible grouping involves arranging students based on their strengths and areas for growth, facilitating collaborative learning and collective problem-solving. Temporary student groups can be formed by teachers to align with specific educational goals, allowing students to tap into each other's knowledge. Various assessment techniques should be employed to enable students to demonstrate their learning through diverse means. This can encompass discussions, written assignments, projects, reports, and presentations, granting students of varying skill levels the opportunity to showcase their abilities. Teaching that is attuned to cultural distinctions entails recognizing and integrating students' cultural backgrounds into the curriculum. This contributes to cultivating an inclusive atmosphere where students' identities and experiences are acknowledged and appreciated. Incorporating scaffolding, educators should provide appropriate levels of support and guidance as students tackle more complex tasks.As students gain competence and confidence, this support can be gradually reduced over time. [11]

2. MATERIALS AND METHOD

Student Evaluations: Student evaluations can be defined as the assessments and feedback provided by students about their educational experiences, courses, instructors, and learning environments. These evaluations aim to gather insights into various aspects of the educational process, including teaching effectiveness, course content, classroom dynamics, and overall student satisfaction. They typically involve students filling out surveys or questionnaires where they share their opinions, observations, and suggestions to help educational institutions enhance the quality of teaching and learning. Student evaluations are used by institutions to make informed decisions about curriculum improvements, faculty development, and educational policies.

Peer Reviews: Peer reviews are a process where work, such as research papers, articles, or projects, is evaluated by individuals who are peers within the same field or domain. These peers are typically experts or professionals with a similar level of knowledge and expertise. Peer reviews aim to ensure the quality, accuracy, and validity of the work by providing constructive feedback, identifying strengths and weaknesses, and assessing whether the work meets the standards of the field. This process helps maintain the integrity and credibility of scholarly and professional contributions.

Self-Assessment: Self-assessment refers to the process of evaluating and analyzing one's own skills, abilities, performance, strengths, and weaknesses. It involves introspection and reflection to gain a better understanding of oneself and one's progress in various aspects of life, such as work, education, personal development, and more. Self-assessment can lead to self-improvement and informed decision-making by identifying areas for growth and setting goals for enhancement.

Classroom Observations: Classroom observations" refer to the process of formally observing and evaluating a teacher's instructional practices and a classroom's learning environment. This is typically done by administrators, peers, or educational experts to assess teaching effectiveness, student engagement, classroom management, and the overall quality of the educational experience. Classroom observations are commonly used for professional development, teacher evaluations, and improving teaching methods. The observations can lead to constructive feedback and insights that help educators enhance their teaching techniques and student outcomes.

Student Performance Data: Student performance data refers to the information collected and analyzed to assess how well students are performing academically. This data typically includes various metrics such as test scores, grades, attendance records, and other indicators of a student's educational progress. By analyzing student performance data, educators and administrators can gain insights into individual and group learning trends, identify areas where students may need additional support, and make informed decisions to enhance the overall quality of education.

Enhanced Learning Outcomes: The term "enhanced learning outcomes" refers to the improved and more favorable results or achievements that students attain as a result of their educational experiences. This can encompass various aspects such as increased knowledge, better skills, higher levels of understanding, and improved performance in assessments or real-world applications.

Continuous Improvement: This approach is rooted in the philosophy that there is always room for improvement in any aspect of a business or organization. Continuous improvement involves regularly reviewing existing practices, gathering feedback, and using data-driven insights to identify areas where enhancements can be made. These improvements can range from small adjustments to major overhauls, all aimed at creating a more streamlined and optimized operation.The concept of continuous improvement is often associated with methodologies such as Lean, Six Sigma, and Kaizen, which provide structured frameworks and tools for organizations to systematically pursue better outcomes. The ultimate goal of continuous improvement is to foster a culture of innovation, learning, and adaptability, where all members of an organization contribute to the ongoing process of refining and advancing the way work is done.

Subjective Bias: Subjective bias, also known as personal bias, refers to the inclination or prejudice that an individual has towards a particular idea, concept, person, group, or situation. It can influence how a person perceives, interprets, and evaluates information and events. Subjective bias is often based on personal experiences, beliefs, emotions, and values, and it can lead to a distorted or one-sided perspective that may not be fully objective or fair. It's important to recognize and manage subjective bias to maintain objectivity and make well-informed judgments.

Time-Consuming: The definition of "time-consuming" pertains to activities or tasks that require a significant amount of time and effort to complete. These endeavors demand a substantial investment of one's time and may potentially lead to delays in other commitments or responsibilities due to the extensive resources they consume**.**

Method: Using an enhanced method of comparing ambiguity through a weighted average, the evaluation of the TOPSIS ranking technique was conducted. Within the TOPSIS approach, a frequently utilized strategy involves incorporating multiple responses to enhance the resolution of issues, reducing uncertainty regarding the weight assigned to each solution while maintaining manageability. This approach consistently maintains a global standpoint [12]. Employing an effective and advanced ranking mechanism known as TOPSIS, the contemporary methodology of TOPSIS aims to efficiently select alternatives that are both notably close to the optimal solution and significantly distant from the worst-case scenario solution. While an inadequate response from a superior leads to an increase in price, an improved response from a superior extends the criteria for benefits and reduces

the criteria for price. The utilization of attribute records is fully accomplished by the TOPSIS method [13]. This method encompasses fundamental features of FMCDM, two activities for fuzzy membership, the TOPSIS technique, and a spreadsheet for data collection. The title delves into the reasons for its use, outstanding concerns, limitations, and suggestions for researchers to enhance the adoption and application of FMCDM [14]. Due to its attributes, TOPSIS serves as an additional measure. It proves to be a more favorable alternative to heuristics due to its reduced factors, increased stability, and a plethora of response values that encompass varying changes in value. The decision to develop TOPSIS was concluded [15].TOPSIS employs five distinct distance metrics to establish rankings, with a numerical instance involving diverse magnitudes of randomly generated issues for computation. A comprehensive comparative analysis of preference ranking sequences is conducted, considering factors like the consistency ratio, odds ratio of optimal alternatives, and average Pearson correlation coefficients. The association between the two variables constitutes the first link, while the second aims to discern the impact of measurements by contrasting the potential outcomes against the mean count of coefficients. The approach involves regression on rows. The compromise programming system establishes the concept of "Proximity to Ideal," incorporating two criteria: "majority" and "minimum," thereby allocating the highest "group utility" to each individual grievance. The TOPSIS approach, which optimally resolves both short-range and suboptimal issues, employs these distance measures to determine solutions. It's worth noting that these aspects are not considered significant. The TOPSIS method, which stands for Technique for Order of Preference by Similarity to Ideal Solution, offers a multi-criteria approach to identifying optimal choices from a set of options. This technique ranks options based on their proximity to an ideal solution while considering worst-case scenarios where shorter distances indicate poorer performance [19]. Despite its apparent rationality, TOPSIS has been subject to criticism. One critique involves the method's adaptation to tackle multi-objective decision-making (MODM) issues without adequately considering the relative importance of individual criteria or the nature of the problem at hand. PIS denotes the shortest distance, while NIS represents the greatest distance. Subsequently, a "condition of satisfiability" is presented for each criterion, succeeded by a maximum-minimum operator for these criteria. The resolution of overlapping usages is achieved by implementing Harmony, as highlighted in a previous study [17]. Among the efficient methodologies is TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution), designed for optimal solution-like regulatory performance. This technique involves analyzing, contrasting, and evaluating the available options. Building upon this foundation, the current investigation aims to extend the application of TOPSIS to real-world assignment-focused group decision-making scenarios. A comprehensive and effective selection process is then outlined [18]. The TOPSIS procedure has concluded. Initially, the influence of the Weighted Euclidean (EW) method on decision-making or evaluation processes is investigated. This examination is founded on diverse statistical data and theoretical assessments. Subsequently, the effects of EW on the TOPSIS technique are evaluated in terms of specific and bilateral stage selections in decision-making or assessment. The role of EW in the selection or assessment process is governed by E-TOPSIS, as outlined in reference [19].

3. RESULTS AND DISCUSSION

TABLE 1. Assessment of Effective Teaching

	Enhanced Learning Outcomes	**Continuous Improvement**	**Subjective Bias**	**Time-Consuming**
Student Evaluations	15	2	0.4	20
Peer Reviews	10	3	0.6	18
Self-Assessment	20	1	0.2	22
Classroom Observations	5	1	0.7	15
Student Performance Data	25	2	0.1	25

Table 1 shows Enhanced Learning Outcomes: The method with the highest values for this category is "Student Performance Data" with a score of 25. The lowest is "Classroom Observations" with a score of 5.Continuous Improvement: The method with the highest values for this category is "Peer Reviews" with a score of 3. The lowest is "Self-Assessment" with a score of 1. Subjective Bias: The method with the highest values for this category is "Classroom Observations" with a score of 0.7. The lowest is "Student Performance Data" with a score of 0.1Time-Consuming: The method with the highest values for this category is "Self-Assessment" with a score of 22. The lowest is "Classroom Observations" with a score of 15.

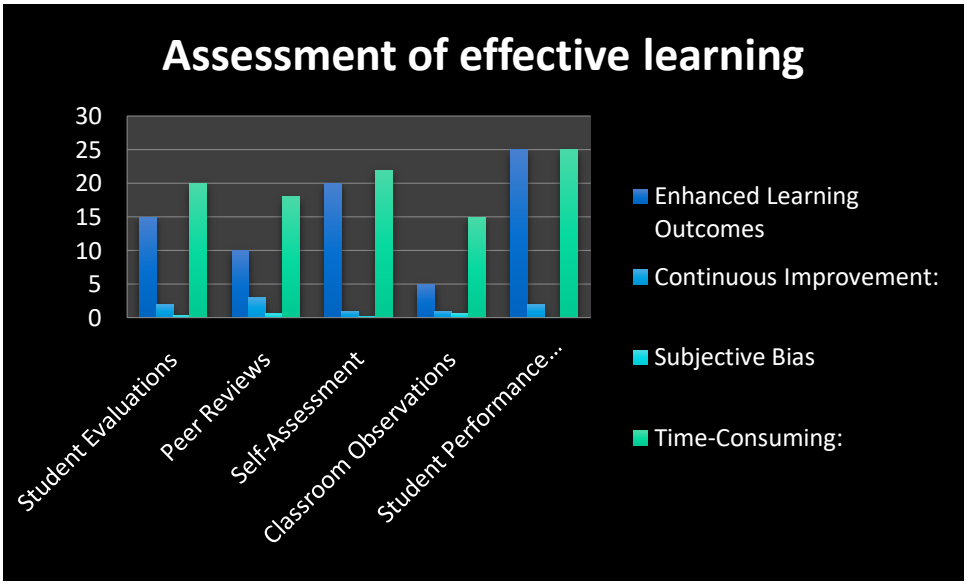

FIGURE 1.operating systems developments

Figure 1 illustrate graphical representation of assessment of effective learning has done

$$X_{n1} = \frac{X1}{\sqrt{((X1)^2+(X2)^2+(X3)^2\ldots)}} \ldots\ldots\ldots 1$$

TABLE 2. Normalized Data

Normalized Data			
Enhanced Learning Outcomes	**Continuous Improvement:**	**Subjective Bias**	**Time-Consuming**
0.4045	0.0539	0.3885	0.4409
0.2697	0.0809	0.5828	0.3968
0.5394	0.0270	0.1943	0.4850
0.1348	0.0270	0.6799	0.3307
0.6742	0.0539	0.0971	0.5511

Table 2 shows the various values of Normalized Data for Enhanced learning outcomes, continuous improvement, subjective bias, time consuming is obtained by using the formula (1).

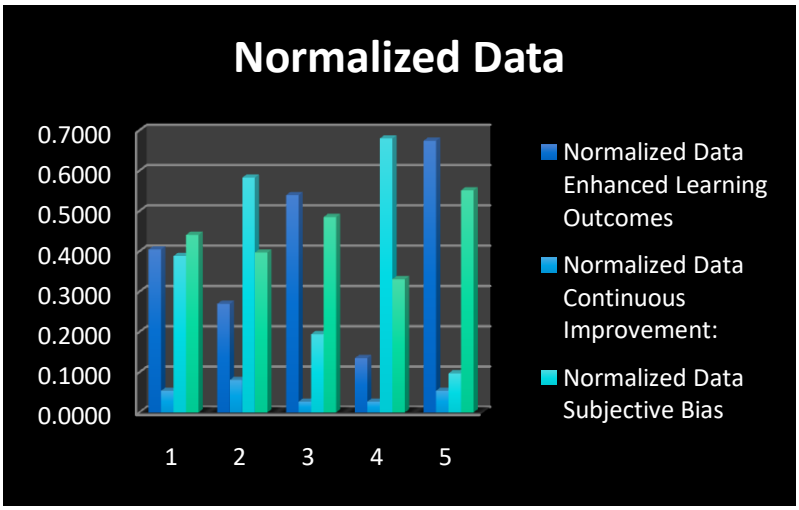

FIGURE 2. Normalized Data

Figure 2 shows the various values of Normalized Data for Enhanced learning outcomes, continuous improvement, subjective bias, time consuming is obtained by using the formula (1)

TABLE 3. Weight ages

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	0.25	0.25

Table 3 shows Weight ages used for the analysis. We taken same weights for all the parameters

$$\boldsymbol{X_{wnormal1}} = X_{n1} \times w_1 \ldots\ldots..2$$

TABLE 4. Weighted normalized decision matrix

0.1011	0.0135	0.0971	0.1102
0.0674	0.0202	0.1457	0.0992
0.1348	0.0067	0.0486	0.1212
0.0337	0.0067	0.1700	0.0827
0.1685	0.0135	0.0243	0.1378

Table 4 shows weighted normalized decision matrix for Enhanced learning outcomes, continuous improvement, subjective bias, time consuming to figure out the weighted normalized decision matrix, we used the formula (2).

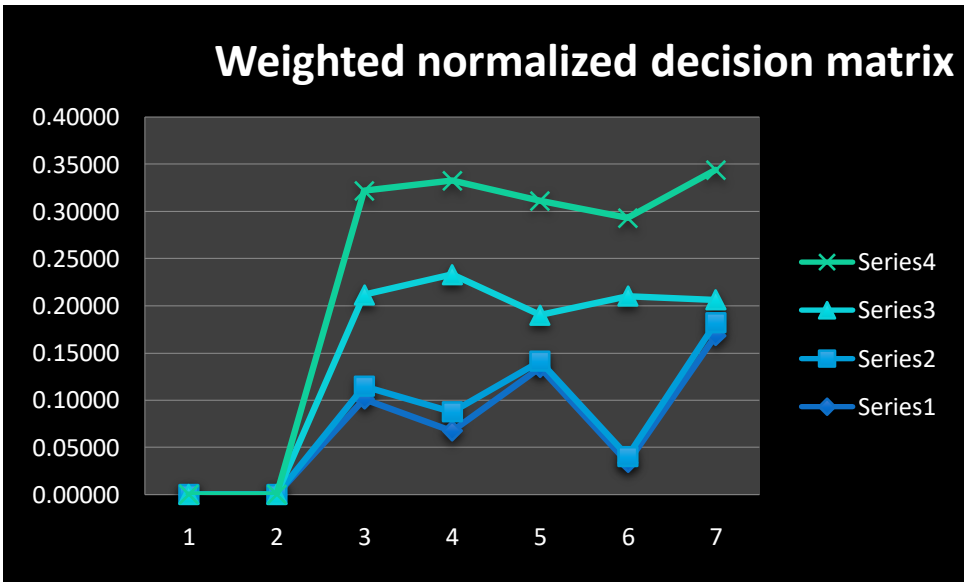

FIGURE 3. Weighted normalized decision matrix

Figure 3shows weighted normalized decision matrix for Performance Enhanced learning outcomes, continuous improvement, subjective bias, time consuming to figure out the weighted normalized decision matrix, we used the formula (2).

TABLE 5. Positive and Negative Matrix

Positive Matrix				Negative matrix			
0.1685	0.0202	0.0243	0.0827	0.0337	0.0067	0.1700	0.1378
0.1685	0.0202	0.0243	0.0827	0.0337	0.0067	0.1700	0.1378
0.1685	0.0202	0.0243	0.0827	0.0337	0.0067	0.1700	0.1378
0.1685	0.0202	0.0243	0.0827	0.0337	0.0067	0.1700	0.1378
0.1685	0.0202	0.0243	0.0827	0.0337	0.0067	0.1700	0.1378

Table 5 shows Positive and Negative Matrix for assessment of effective learning student evaluations, peer reviews, self assessment, classroom observations , student performance data. In various Positive Matrix in Maximum value 0.1685,0.0202 Minimum value0.0243,0.0827 is taken and for Negative matrix the Minimum value 0.0337, 0.0067 and Maximum value 0.1700, 0.1378 taken.

TABLE 6. Final Result of operating systems developments

SI Plus	Si Negative	Ci	Rank
0.1032	0.1032	0.5000	**3**
0.1589	0.0583	0.2684	**4**
0.0583	0.1589	0.7316	**2**
0.1990	0.0551	0.2169	**5**
0.0555	0.1986	0.7815	**1**

Table 6 shows the final result of TOPSIS for operating systems developments Figure 3 shows the TOPSIS Analysis Result of operating systems developments In Table 6, Si positive is calculated using the formula (3). From figure 4, In Si positive, operating system E is having is Higher Value and operating system D is having Lower value. Si Negative is calculated using the formula (4). In Si Negative, operating system C is having is Higher Value operating system E is having Lower value. Ci is calculated using the formula (5). In Ci, operating system C is having is Higher Value and operating system E is having Lower value.

$$X_{si+1} = \sqrt{((X_{wn1} - X_{p1})^2 + (Y_{wn1} - Y_{p1})^2 + (Z_{wn1} - Z_{p1})^2}).....3$$

$$X_{si-1} = \sqrt{((X_{wn1} - X_{n1})^2 + (Y_{wn1} - Y_{n1})^2 + (Z_{wn1} - Z_{n1})^2} \quad (4)$$

$$X_{ci1} = \frac{X_{si-1}}{(X_{si+1}) + (X_{s(i-1)})} \quad (5)$$

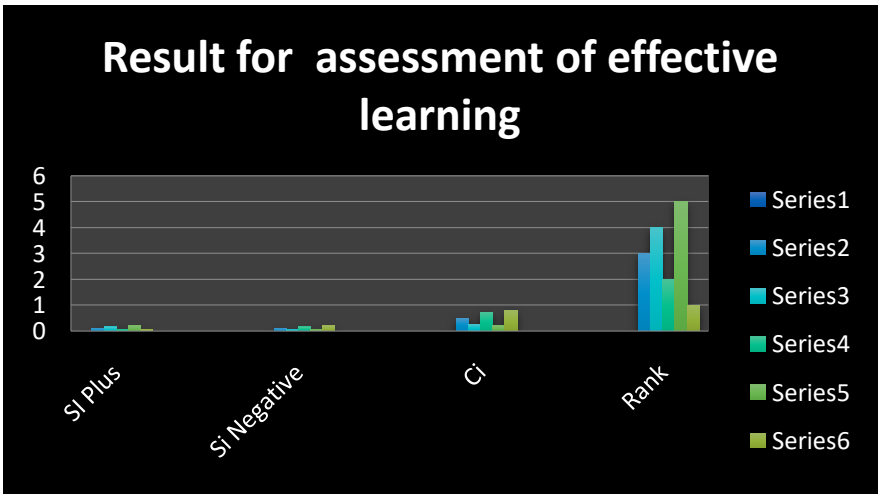

FIGURE 4. Result for assessment of effective learning

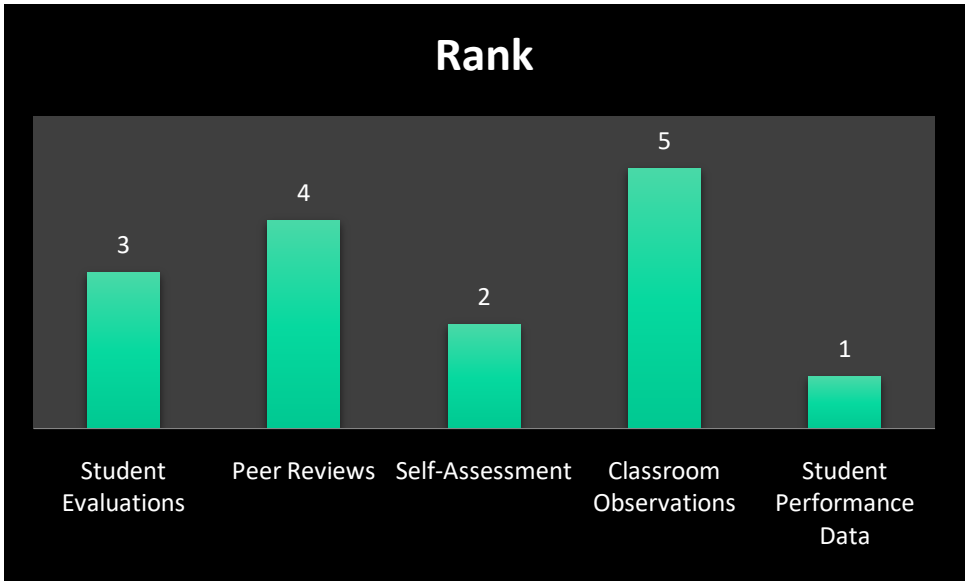

FIGURE 5. Rank

Figure 5 Shows the Rank for assessment of effective learning. Student performance data is got the first rank and classroom observation is having the lowest rank.

4. CONCLUSION

The assessment of effective teaching is a multifaceted and dynamic process that plays a crucial role in enhancing educational outcomes and student learning experiences. Through a comprehensive and balanced approach to assessment, educators and institutions can gather valuable insights into instructional strategies, classroom dynamics, and overall teaching effectiveness. The process of assessing effective teaching involves a combination of qualitative and quantitative methods, including classroom observations, student feedback, peer evaluations, self-assessment, and analysis of student performance outcomes. These methods collectively provide a holistic view of a teacher's impact on student engagement, comprehension, and growth. It's important to recognize that effective teaching goes beyond the mere transmission of knowledge; it encompasses the ability to inspire curiosity, critical thinking, and lifelong learning skills. As such, assessments should focus not only on content delivery but also on the fostering of a positive and inclusive learning environment that supports diverse learning styles and individual needs. Furthermore, assessments of effective teaching should be ongoing and formative in nature, allowing teachers to continually reflect on their practices and make necessary adjustments. Constructive feedback from peers, mentors, and students can facilitate professional growth and the refinement of teaching strategies over time. Institutional support is pivotal in promoting effective teaching assessment practices. Adequate resources, professional development opportunities, and recognition for effective educators create a conducive environment for fostering excellence in teaching. Moreover, integrating assessment outcomes into decisions about tenure, promotions, and professional advancement can further incentivize educators to continuously improve their teaching methods. In conclusion, the assessment of effective teaching is an integral part of the educational landscape, driving quality improvements and better learning outcomes. By embracing a comprehensive and collaborative approach to assessment, educators and institutions can collectively contribute to the advancement of teaching excellence and the holistic development of students.

REFERENCES

[1]. Iqbal, Md Hafiz, Shamsun Akhter Siddiqie, and Md Abdul Mazid. "Rethinking theories of lesson plan for effective teaching and learning." *Social Sciences & Humanities Open* 4, no. 1 (2021): 100172.

[2]. Wiens, Peter D., Kevin Hessberg, Jennifer LoCasale-Crouch, and Jamie DeCoster. "Using a standardized video-based assessment in a university teacher education program to examine preservice teachers knowledge related to effective teaching." *Teaching and Teacher Education* 33 (2013): 24-33.

[3]. Chew, Stephen L., and William J. Cerbin. "The cognitive challenges of effective teaching." *The Journal of Economic Education* 52, no. 1 (2021): 17-40.

[4]. Johnson, Carla C., Jane Butler Kahle, and Jamison D. Fargo. "Effective teaching results in increased science achievement for all students." *Science Education* 91, no. 3 (2007): 371-383.

[5]. Schleicher, Andreas. "Lessons from the world on effective teaching and learning environments." *Journal of Teacher Education* 62, no. 2 (2011): 202-221.
[6]. Madsen, Clifford K., Jayne M. Standley, James L. Byo, and Jane W. Cassidy. "Assessment of EffectiYe teaching by instrumental music student teachers and experts." *Update: Applications of Research in Music Education* 10, no. 2 (1992): 20-24.
[7]. Giovannelli, Marietta. "Relationship between reflective disposition toward teaching and effective teaching." *The journal of educational research* 96, no. 5 (2003): 293-309.
[8]. Collie, R. J., and A. J. Martin. "Adaptability: An important capacity for effective teachers. Educational Practice and Theory, 38 (1), 27-39." (2016).
[9]. Artiles, Alfredo J., and Karen McClafferty. "Learning to teach culturally diverse learners: Charting change in preservice teachers' thinking about effective teaching." *The Elementary School Journal* 98, no. 3 (1998): 189-220.
[10]. MacSuga-Gage, Ashley S., Brandi Simonsen, and Donald E. Briere. "Effective teaching practices: Effective teaching practices that promote a positive classroom environment." *Beyond Behavior* 22, no. 1 (2012): 14-22.
[11]. Stanovich, Paula J., and Anne Jordan. "Canadian teachers' and principals' beliefs about inclusive education as predictors of effective teaching in heterogeneous classrooms." *The Elementary School Journal* 98, no. 3 (1998): 221-238.
[12]. Behzadian, Majid, S. KhanmohammadiOtaghsara, MortezaYazdani, and Joshua Ignatius. "A state-of the-art survey of TOPSIS applications." Expert Systems with applications 39, no. 17 (2012): 13051-13069.https://doi.org/10.1016/j.eswa.2012.05.056
[13]. Salih, Mahmood M., B. B. Zaidan, A. A. Zaidan, and Mohamed A. Ahmed. "Survey on fuzzy TOPSIS state-of-the-art between 2007 and 2017." Computers & Operations Research 104 (2019): 207-227.https://doi.org/10.1016/j.cor.2018.12.019
[14]. Shukla, Atul, Pankaj Agarwal, R. S. Rana, and Rajesh Purohit. "Applications of TOPSIS algorithm on various manufacturing processes: a review." Materials Today: Proceedings 4, no. 4 (2017): 5320-5329.https://doi.org/10.1016/j.matpr.2017.05.042
[15]. Opricovic, Serafim, and Gwo-HshiungTzeng. "Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS." European journal of operational research 156, no. 2 (2004): 445-455.https://doi.org/10.1016/S0377-2217(03)00020-1
[16]. Jahanshahloo, Gholam Reza, F. HosseinzadehLotfi, and Mohammad Izadikhah. "An algorithmic method to extend TOPSIS for decision-making problems with interval data." Applied mathematics and computation 175, no. 2 (2006): 1375-1384.https://doi.org/10.1016/j.amc.2005.08.048
[17]. Kuo, Ting. "A modified TOPSIS with a different ranking index." European journal of operational research 260, no. 1 (2017): 152-160.https://doi.org/10.1016/j.ejor.2016.11.052
[18]. Shih, Hsu-Shih, Huan-JyhShyur, and E. Stanley Lee. "An extension of TOPSIS for group decision making." Mathematical and computer modelling 45, no. 7-8 (2007): 801-813.https://doi.org/10.1016/j.mcm.2006.03.023
[19]. Chen, Pengyu. "Effects of the entropy weight on TOPSIS." Expert Systems with Applications 168 (2021): 114186.https://doi.org/10.1016/j.eswa.2020.114186

