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Evaluation of E- Learning Undergraduate Nursing Students in a Faculty of Nursing

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Abstract: This short investigates the assessment of online education and its usefulness as a learning instrument. The research looks on the many assessment approaches that are used to measure the results and effect of e-learning programmers. It investigates the role of student satisfaction, knowledge acquisition, and skill development in determining the effectiveness of e-learning. The abstract discusses the difficulties and constraints in measuring e-learning, as well as the necessity for standardized evaluation frameworks. Finally, the goal of this research is to give insights into the assessment process, so assisting educators and policymakers in making informed judgements about integrating e-learning into educational institutions. Introduction: The introduction gives an outline of e-learning assessment and its significance in current education. E-learning has gained popularity as an adaptable and readily available learning method, but its performance must be assessed to ensure optimal results. The purpose of this introduction is to emphasize the need of evaluating e-learning programmers to identify their influence on student happiness, acquisition of knowledge, and skill development. It also highlights the need of a standardized assessment framework in facilitating accurate and trustworthy evaluations. Educators and policymakers may make more informed judgements to increase the efficacy of e-learning projects if they understand the evaluation process. Research significance: The assessment of e-learning research is critical in the realm of education. For starters, it allows educators to assess the efficacy of e-learning programmers in reaching targeted learning objectives. Second, it sheds light on how e-learning affects student satisfaction and engagement. Third, this research identifies opportunities for improvement in the design and delivery of e-learning. It also contributes to the establishment of a standardized assessment system, which promotes comparability and dependability across various e-learning programmers. Finally, the significance of this research resides in its capacity to increase the quality and efficacy of e-learning practices, resulting in better educational experiences for students. Method: The Grey Relationship Analysis (GRA) approach is a decision-making tool designed to analyses and assess connections between variables in circumstances when information is ambiguous or inadequate. It is especially beneficial when working with systems with insufficient data or dynamic and complicated interactions. GRA use grey numbers to show the data's uncertainty and incompleteness, enabling for more exact analysis. By generating grey relational grade, the approach assists decision makers to arrive at informed choices by identifying the most significant elements or factors in a system. GRA can be used in a variety of industries, including banking, technology, and management, where there is ambiguous or partial information. Alternative parameters: Analysis, Design, Development, Implementation, Evaluation. Evaluation parameters: E-Learning Environment, Webpage Connection, Learning Records, Instruction Materials. Result: Analysis in 3rd rank, Design in 4th rank, development in 2nd rank, implementation in 5th rank, evaluation 1st rank. Conclusion: evaluation of e learning is progressed. Here is the rank for alternative parameters Analysis in 3rd rank, Design in 4th rank, development in 2nd rank, implementation in 5th rank, evaluation 1st rank.

Keywords: Analysis, Design, Development, E-Learning Environment.

1. INTRODUCTION

E-learning is the most contemporary method of delivering remote education, utilizing the Internet to provide learning materials and procedures. When making distant data and tools available to users, several aspects like backgrounds in culture, technical experience, technological equipment, and physical/cognitive capacities should be considered. It is critical to give widespread utilization of e-learning facilities in order to prevent the phenomena of a technological gap in this culturally and socially vital application domain. One of the keys aims for e-learning application developers should be to provide easy access and usability to many users, since this is a condition for enable users to use such apps financially. The goal of instructional programmed is to aid with learning. The development of programmed that can engage new students and assist them in learning even remotely is a big problem for architects and HCI (human computer interaction) researchers. Clearly, software for education must consider the many ways kids learn and make student interactions as easy and intuitive as feasible. This may necessitate the revision of old interaction paradigms in order to give new adaptability and flexibility relevant to the specifics of a specific application sector. To that end, there ought to be a synergy among the process of learning and the students' involvement with the programmed. Usability elements should not only enable individuals to

handle interactive software effectively, but they ought to also be relevant in terms of the intended learning activity [1]. We discovered that five approaches (questionnaire, review of documents, interviews, focus groups, and computer log data) were employed to evaluate a wide variety of outcome measures (n 14 52). This conclusion emphasizes the lack of a uniform and shared foundation for medical education study (Cook, Beck man, & Portage, 2007). Only a few research went beyond the person to get an understanding of the complicated setting that determines effective e-learning deployment in LMICs. Rohwer et al. (2013), for example, explored instructors' opinions of clinical online education in study subjects and groups, offering a new layer of understanding into their intervention. The cultural context must be considered in order to reduce dissatisfaction and provide an enjoyable place to learn (Mayer, 2007). Teachers have demonstrated that they assist "students adapt to the format of the content to develop an educational programmed that is culturally and intellectually relevant for different nation" [2] when e-learning resources are not tailored to the context of the individual LMICs. They will evaluate how students are doing in a particular course. Bloom's taxonomy was created to help scholars' categories the goals of learning. The taxonomy was created to help professors, gifted experts, and supervisors assess student achievement in any subject. Bloom's taxonomy categorizes behavior into three major categories, each of which influences how people learn in a different way: cognitive, emotional, and psychomotor. Although Bloom's taxonomy has been used to measure student learning in traditional settings, it has not been widely explored in an e-learning situation. This might be owing to differences in both methodologies. Students' physical distance, absence of direct replies, and the absence of evaluation limits seen in e-learning settings provide obstacles in measuring the process of learning [3]. Global health systems confront several problems, including demographic shifts, growing medication and medical technology prices, and persisting and widening health inequities within and across nations. Simultaneously, concerns such as personal silos, set clinical curricula, and "information saturation" have rendered educational opportunities and continuing education (CPD) challenging in trying to adjust to and adapt to the evolving demands of patient-centered healthcare professionals. Environments for collaborative and/or remote distribution. In response to these issues, a rising number of medical schools and continuing professional development programmed have embraced e-learning methodologies, which have been proved to deliver flexible, low-cost, user-inclusive, and readily upgraded learning. However, the efficiency of e-learning varies by context, and it has been demonstrated to lay significant demands on the motivation of users and "digital literacy," as well as on supplying institutions. As a result, as part of continuing quality improvement initiatives, it is necessary to assess the efficacy of the e-learning in health care. This paper discusses critical concerns for constructing effective models for analyzing eHealth learning [4]. As a result, online learning is increasingly vital for many real-world jobs, and educational institutions are under economic pressure to provide adaptable learning and cost-saving solutions. However, there is widespread criticism of the present systems' quality. According to a study (Baruque and colleagues, 2007), many organizations continue to experiment with e-learning, employing various methodologies as well as various technology and models to offer e-learning material. As a result, it is unclear how to assure the caliber of an online education website. Online instruction online quality is a complicated term with various assessment expectations. concerns associated with e-learning include organizational, management, instructional, and technological concerns [5]. Simultaneously, focus group talks emphasized the significance of teachers. "...whenever I provide an email to a teacher or write a thing on the forum, I accessible my U-Link meeting eagerly since I don't know what to say, but when the teacher doesn't answer my query, my interest to log into a U-Link meeting decreases dramatically," one of the students said. "...the instructor is nice and his ways are liked, which makes me desire to utilize U-Link..." adds another pupil. In brief, the teacher reacts fast to students, his teaching technique is acceptable, plus his explanations are clear, if he has control of the technology, students' perceived happiness with e-learning improves [6]. Because of the uniqueness and distinctiveness of the educational process, the complex features of learners, and the range of learning activities, evaluating the usability of apps for e-learning requires specific consideration. As a result, practically any e-learning programmed is extremely sophisticated. Usability was neglected or merely utilized in the initial stages of the e-learning phenomena, which meant that most assessment attempts were undertaken in "traditional" ways [7]. Reffay & Chanier (2003) define visualization in the setting of analysis of social networks, which analyses the coherence of small groupings of learners. Cohesion has been accounted for in a variety of ways to emphasize the various roles of solitary individuals, active categories, and participants in group communication systems. Take note of the link between this aim and the usual student behavior mentioned in the preceding sections. This strategy enables the virtual teacher to demonstrate universal features at the individual and group levels, as well as successfully assist the virtual instructor in following cooperative strategies within the group [8]. Along with the ongoing issues of proving scholarship, e-learning provides professors with several research options. Innovations in e-learning technology hint to a revolution in education, which will enable personalized learning (adaptive learning), improving students' interactions with other students (collaborative learning), and altering the teacher's role. The incorporation of e-learning in medical education will encourage the application on adult learning theory, in which educators will no longer function just as material distributors, but as facilitator of learning and evaluators of competency [9]. E-learning, often known as online education or web-based education, is a sort of distant learning whereby training or instructional content is supplied to a distance

student electronically through an internet connection or intranet. A flexible infrastructure that incorporates instructional resources, books, and other resources into one device in order to generate and distribute training or instructional materials quickly, efficiently, and affordably is provided by an e-learning system. It has emerged as a viable alternative to traditional classroom instruction [10]. He believes that digital channels of instruction and instruction will enable access to ongoing education to a far larger population than traditional distant learning approaches now provide. Indeed, hopes for e-learning the its place in the "acquiring knowledge revolution' have been extensively publicized in the media and the press. Those in higher learning are aware with the field's continual changes and innovations, and certain individuals are more effective than others. Elsewhere, many programmed with lofty aspirations and aims presume that technology will offer access and chances, but also lays the onus of involvement on the person (Hodson 2002) [11]. Because of international shared instruction, student-centered learning, enough learning assistance, and learning flexibility, most students thought that the educational value of this course was equivalent to, or even greater than, face-to-face learning. This research demonstrates that utilizing a structured PDPP evaluation approach may assure high quality teaching and learning. The PDPP assessment model and its implementation are seen to be a good starting point for building a complete e-learning quality assurance system in educational settings [12]. E-learning application usability evaluation is an emerging topic that draws on interfaces, usability, and human-computer interaction (HCI), as well as lessons from teaching and learning. Time, expenses, efficiency, effectiveness, and simplicity of use all impact the selection of usability evaluation methodologies (UEMs) for evaluating usability concerns. Heuristic evaluation (HE) entails evaluation by domain experts and/or HCI specialists. This comparative assessment research investigates the degree to which usability issues are detected in a web-based educational software and compares the findings to end user (learner) survey ratings. Severity evaluation was carried out based on aggregating usability issues and a comparison of findings about major and minor issues [13]. The systematic transmission of information to students, according to one fundamental reason supporting the paradigm shift, is more likely to foster superficial learning techniques among pupils, wherein retention is temporary, generalization of knowledge is restricted, and learning is limited [14]. In e-learning systems, adaptation has gotten very little attention. An online education course shouldn't be developed in a bubble; rather, it should be tailored to students' requirements and preferences as precisely as possible, and it should evolve as the course advances. This research gives a comparison of open-sourced e-learning platforms in order to determine the best platform for customizable extension. The enlarged platform will be utilised in a live classroom setting. As a result, the general operation of the site is just as significant as the adaptive abilities therefore the assessment takes both into account [15].

2. MATERIALS AND METHOD

2.1. Analysis: The analysis phase entails acquiring and assessing information in order to comprehend the tasks requires, goals, and requirements. Selecting the target audience, setting learning objectives, and doing a detailed study of current resources and restrictions are all part of this process. This phase establishes the groundwork for the succeeding stages of the educational design process.

2.2. Design: Instructional designers provide a roadmap for the educational experience throughout the design process. Designing the general structure and organization of material, selecting relevant instructional methodologies and media, and creating a thorough plan or storyboard are all part of this process. The design phase is concerned with developing interesting and effective educational opportunities that are in line with the defined aims and objectives.

2.3. Development: Development is the process of developing real educational resources based on design criteria. This involves generating multimedia components, authoring material, developing interactive activities, and putting all of the pieces together in a coherent and user-friendly fashion. To ensure the quality and correctness of learning materials, this step necessitates the participation of educational designers, subject matter specialists, and multimedia professionals.

2.4. Implementation: During the implementation phase, the generated learning materials are released and made available to learners. This comprises using an e-learning platform, uploading content, and making it available to the desired audience. It is critical to guarantee that the technological infrastructure is correctly set up throughout implementation and that there is an opportunity for education if there are no technical challenges.

***2.5. Evaluation*:** The assessment step entails assessing the efficacy and impact on the e-learning programmer. This involves gathering and analyzing data to evaluate whether learning objectives were accomplished, assessing learner satisfaction and participation, and determining areas for improvement. Surveys, evaluations, interviews, and application analysis are all examples of evaluation procedures. The assessment phase's findings aid in future adjustments and enhancements to the e-learning programmer, assuring ongoing progress.

Evaluation parameters

2.6. E-Learning Environment: The e-learning environment is a digital platform or location where online learning occurs. It contains a virtual environment where students may access training materials, participate in engaging

tasks, and communicate with instructors or classmates. Learning management systems (LMS), interactive platforms, video conferencing tools, and customized web portals are all examples of e-learning environments. The design yet functioning of a virtual classroom are critical in providing learners with an optimum and engaging educational experience.

2.7. Webpage Connectivity: *The* capacity to establish and sustain a dependable link between a learner's equipment and a e-learning website or webpage is referred to as webpage connectivity. For continuous access to educational content, interactive capabilities, and multimedia components, a reliable and fast speeds Internet connection is required. The total learning experience is influenced by web page connection, which ensures that learners can move through information, participate in conversations, submit tasks, and access tools without disruption.

2.8. Learning Records: Education files track and document information about a learner's progress, accomplishments, and interactions in an e-learning environment. These act as an electronic archive of courses, examinations, tasks, and other types of learning activities that have been completed. Learners can use learning logs to track their own development, and instructors and administrators can use them to track and assess student performance. These data frequently include completion dates, grades, and timestamps, offering a complete picture of student involvement and outcomes.

2.9. Instructional Materials: The information and resources used to promote education in a virtual classroom are referred to as instructional materials. Textual resources, multimedia features (such as films, recordings, and animation), active components, quizzes, and assessments are all included. Instructional resources are intended to convey knowledge, demonstrate concepts, and allow for practice and application. Instructional materials that are well-designed adapt to varied learning styles, foster engagement and conversation, and aid in the achievement of learning objectives. They are crucial in creating successful and interesting e-learning experiences.

2.10. Method: The goal of this study is to look at multi-attribute decision-making issues using intuitively fuzzy information, where attribute weights are unknown and attribute values are intuitive fuzzy integers. To acquire the attribute weight vector, we create an optimization model based on the fundamental ideal of the classic Grey Correlation Analysis (GRA) approach, which allows us to calculate the attribute weights. The standard GRA approach is then used to address intuitively fuzzy multi-attribute decision-making issues with incompletely known weight data. It is determined the magnitude of the grey association between each option as that positive-ideal answer and the negative-ideal solution. The grey coefficient of correlation for the two solutions positive-ideal solutions (PIS) and overall negative-ideal solution (NIS) is then calculated concurrently to establish the order of priority of all options. Finally, an illustrated case is provided to validate the established technique and demonstrate its applicability and efficacy [16]. The process of assessing different options and picking the best one by considering numerous criteria is known as multi-criteria decision making (MCDM). Because objective things are typically complicated, ambiguous, and uncertain, scale values frequently take the form of variables related to speech that may be described as interval-valued triangular numbers that are hazy. The goal of this study is to provide an extended grey correlation analysis (GRA) approach for dealing with MCDM difficulties. Some optimization models based on the fundamental notion of the conventional GRA technique [17] have been developed to find the criteria weights. The first step is to deal with the zeros in the first estimate, while the second is to develop their minimal information policy. We provide a revised reading of GRA [18]. This method distinguishes itself by employing an experimental design strategy to assign weights of attributes and combining multiple MCDM estimate methods to produce a hybrid making decisions model. This approach assists the choice maker in reaching a sensible conclusion without the need for professional skills or substantial expertise. Ranking results obtained through numerous MCDM approaches are more trustworthy than those obtained through a single MCDM approach. The proposed solution is shown in a real-world situation including an IC packaging firm. Four further numerical examples are supplied to show the method's usefulness. In all situations, the suggested technique produced findings that were comparable to earlier research, confirming the system's validity and potential to address real-world MCDM challenges. The response spectrum method (RSM) is used to estimate the experimental results. The constructed model will assist the decision taker in making an informed choice. The suggested technique has three major benefits over previous MCDM systems. First, an experimental design approach is used to allocate weight. The DM can use this approach to calculate the relative relevance of each criterion statistically. The opinions of many specialists are vital in the process of making choices in traditional MCDM procedures. Many of DM's criterion judgements are subjective and hence inaccurate. Adjustments in attribute weights have a large impact on ranking outcomes. If the MCDM method's weighting process is not followed effectively, the weights are going to be created inaccurately, influencing the MCDM approach's conclusion. Comparative judgements do not call for a specialist to assign precise numerical values in our technique. This eliminates the subjective nature of human preferences in choice-making and decreases susceptibility to modifications in attribute weights. Consequently, rating outcomes become more equal and consistent. In addition, a model of regression is created to assist DMs in making judgements. An MCDM model is developed in our work utilizing a mixed the design of experiments and RSM regression technique. The alternative estimation technique may be simply 68 simplified after the formula for regression is developed [19]. Using expert comments and a literature analysis, pick the finest battery tank, metal hydride, and chemical solutions for storage for gas (HES) solution for Turkey. As a consequence, we provide a multi-

criteria decision-making strategy (MCDM, which comprises Bonferroni Extension-based On Analytic Hierarchy Procedure (Fuzzy-AHP) and Gaussian Normalization-based Fuzzy Grey Correlation Analysis (Fuzzy-GRA)). For the process, a combination strategy may be employed, and it is additionally feasible to solve the HES selection issue utilizing various defuzzification approaches. Literature on MCDM [20]. These LTSs convert easily into stochastic linguist sets (PLTSs). A Grey Correlation Analysis (GRA) technique is a Bayesian linguistic MAGDM with attribute weights that are fully unknown. In such a study, is examined in order to overcome. First, utilizing the SPECIFICATION CRITIC method, a scoring function is employed to objectively establish attribute weights. The optimal alternative is chosen by computing the biggest comparative association level from the Unknown Linguistic Positive Proper Solution (PLPIS) while taking its PLPIS plus the largest grey correlation value into account. Unknown Linguistic Bad Correct Solution Grey Correlation Value (PLNIS). The proposed method broadens the scope of the classic GRA method. Finally, the proposed technique is demonstrated using a mathematical model for determining the precise position of charging infrastructure for electric cars (EVCS). Some comparison studies are performed to validate the efficacy of a certain strategy. For ordinary GRA algorithms, we employ analytical linguistics MAGDM with unknown weight information. To begin, the fundamental notion of PLTs, the comparison formula, and the concept of the Hamming distance are simply introduced. The CRITIC approach is then used to objectively establish attribute weights based on the score function specification. The best choice is determined by the "Largest Degree of Grey Relationship Coefficient" from PLNIS and the "Smallest Degree of Grey Relational Coefficient" from PLNIS. Finally, a real-world instance report for EVCS choice of location is being developed to validate the suggested process, while further comparison studies will be conducted to confirm applicability [21]. Students at major public colleges sometimes struggle to navigate the tangle of programmer options and requirements. Coursework for majors may be intimidating, and even professional academic advisers have difficulty guiding students, particularly when an applicant is contemplating many majors at various universities and schools. The institution could clearly enhance its graduation rate through focusing on enhancing educational guidance so that students pursue clear and sensible routes to the degrees they seek, as well as boosting the number of spots in necessary and prerequisite courses. Students at UF must make two admissions selections. First, they must be admitted to the institution; second, people must be admitted to a major. There are various advantages to this two-part technique. Most states rely on student enrolment to fund institutional budgets, and direct enrolment at higher education institutions makes campus-wide administration of enrolment extremely challenging. Furthermore, many freshmen arrive on university uncertain about a major or with unreasonable personal or parental demands for a major [22]. A linguistic name for a novel idea of a spherical language fuzzy set with neutral, positive, and negative member degrees that fulfil the constraints that the sum of all the square of its member degrees is under or equal to 1. We examine the fundamental functions for spherical linguistically fuzzy sets and describe some relevant results in this work. Based on spherical fuzzy numbers, we expand the functional laws of operators for aggregation and present the coquette integrated weighted average (SLFCIWA) operator. In addition, the SLFCIWA operation spherical fuzzy number developed here is used to multi-attribute collectively decide issues. In addition, we present a GRA approach for generating spherical fuzzy information. To put into practice, the proposed models, we show various numerical uses for group decision-making issues. We find that the new approach is far more efficient and dependable than the existing model. The Pythagoras fuzzy GRA technique fails to solve the spherical multilingual fuzzy MADM issues with unknown weights. The intriguing and crucial study in this work is to generate attribute weights using the classic GRA approach from both supplied spherical linguistically fuzzy information and wholly unknown attribute weight information. As a result, it is critical to pay notice to this issue. The goal of this study is to create a GRA technique idea for addressing MADM issues in a sphere linguistic fuzzy surroundings, where data regarding attribute weights are unknown and attribute values are represented by spherical linguistic numbers that are fuzzy [23]. A five-dimensional method for addressing sustainability ranks energy producers as the strongest depiction of energy sustainability. Environment, society, economics, technology, and organization are the five major dimensions. To evaluate energy producers and eliminate the confusion of the linguistic opinions of experts' subjective preferences, a revised grey correlation analysis (GRA) approach based on grey numbers is applied. A case investigation of Iran's energy industry is explored to illustrate the usefulness of this five-dimensional approach as well as validate the created technique. Several exploration interviews were done with specialists from Iran's Renewable Energies System (SUNA) and certain university experts for this purpose, and the primary elements influencing energy producers' sustainability assessments were discovered. The suggested model's competence was validated by comparing the results to the GRA technique [24]. Due to the growing competition of globalization, one of the most important criteria for an organization's success is hiring the most suited workers. Because of the relevance and intricate nature of the staff selection problem, a system that combines subjective and objective evaluations rather than subjective judgements is required. The goal of the paper is to provide a novel strategy for solving decision making problems. Grey relationship analysis (GRA) is used to present an intuitive fuzzy group decision-making procedure. An Intuitive Fuzzy Weighted Mean (IFWA) operation is used to integrate decision makers' individual opinions into a collective opinion. The energy scores of fuzzy sensitivity criteria are calculated intuitively. GRA is used for alternative ranking and selection [25].

3. RESULT AND DISCUSSION

TABLE 1. Evaluation of E Learning

	DATA SET			
	E-Learning Environment	Webpage Connection	Learning Records	Instruction Materials
Analysis	55.06	150.39	36.05	22.05
Design	40.05	142.97	33.69	27.3
Development	67.05	122.58	29.18	23.1
Implementation	50	155.36	50	50
Evaluation	45.36	140.5	24.6	17.59
	B	B	NB	NB

Table 1 shows that GRA Decision making trail and Alternative parameters are Analysis, Design, Development, Implementation, Evaluation. Evaluation parameters are E-Learning Environment, Webpage Connection, Learning Records, Instruction Materials.

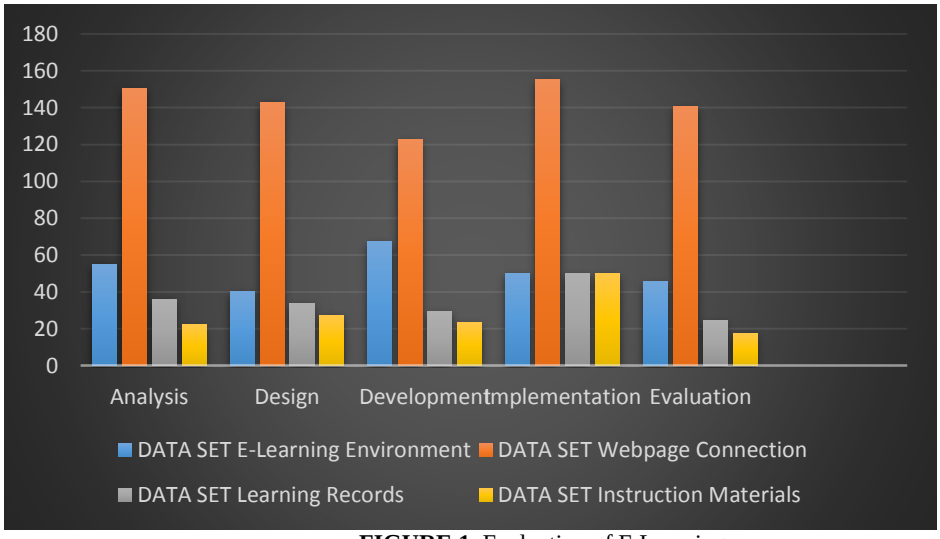

FIGURE 1. Evaluation of E Learning

Figure 1 shows that GRA Decision making trail and Alternative parameters are Analysis, Design, Development, Implementation, Evaluation. Evaluation parameters are E-Learning Environment, Webpage Connection, Learning Records, Instruction Materials.

TABLE 2. Normalized Matrix

Normalized Data			
E-Learning Environment	Webpage Connection	Learning Records	Instruction Materials
0.555926	0.848383	0.549213	0.862388
0	0.622026	0.642126	0.700401
1	0	0.819685	0.829991
0.368519	1	0	0
0.196667	0.546675	1	1

Table 2 shows that the Normalized matrix in Analysis, Design, Development, Implementation, Evaluation. With respect to the E-Learning Environment, Webpage Connection, Learning Records, Instruction Materials.

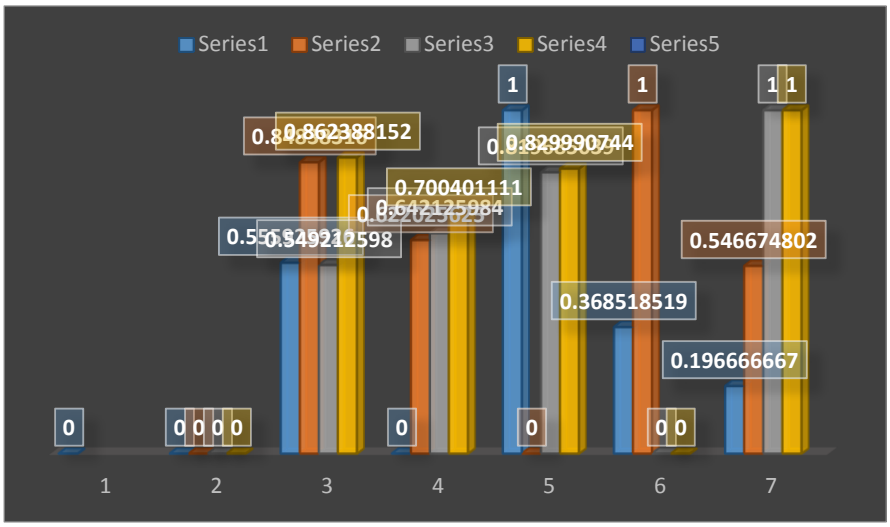

FIGURE 2. Normalized Matrix

Figure 2 shows that the Normalized matrix in Analysis, Design, Development, Implementation, Evaluation. With respect to the E-Learning Environment, Webpage Connection, Learning Records, Instruction Materials.

TABLE 3. Deviation Sequence

Deviation sequence			
E-Learning Environment	Webpage Connection	Learning Records	Instruction Materials
0.444074	0.151617	0.450787	0.137612
1	0.377974	0.357874	0.299599
0	1	0.180315	0.170009
0.631481	0	1	1
0.803333	0.453325	0	0

Table 3 shows the deviation sequence of the alternative parameters with the evaluation parameters.

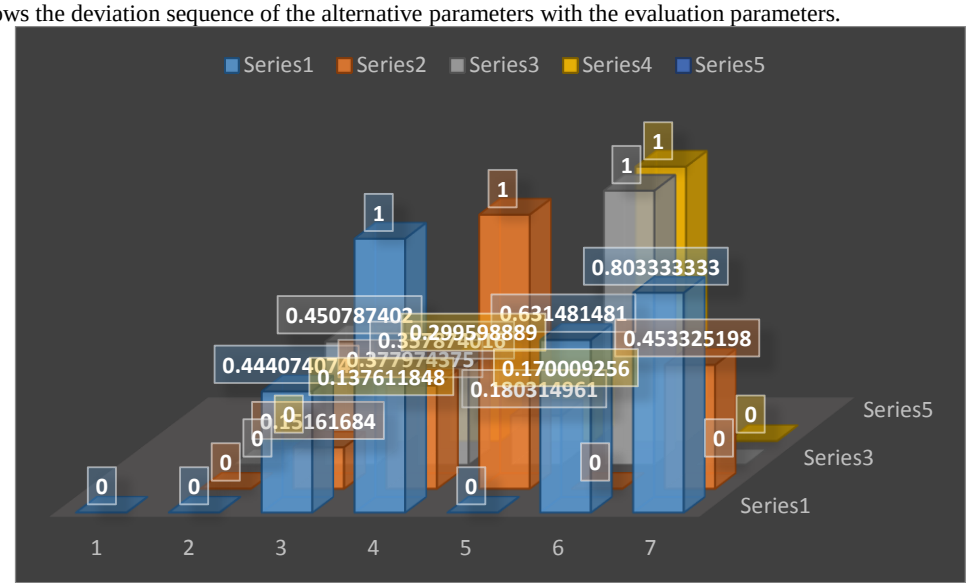

FIGURE 3. Deviation Sequence

Figure 3 shows the deviation sequence. It is obtained by the maximum of the column minus the first value.

TABLE 4. Grey Relation Coefficient

Grey relation coefficient			
E-Learning Environment	Webpage Connection	Learning Records	Instruction Materials
0.529619	0.767322	0.52588	0.784176
0.333333	0.569493	0.582836	0.625314
1	0.333333	0.734954	0.746258
0.441899	1	0.333333	0.333333
0.383632	0.52448	1	1

Table 4 shows the grey relation coefficient matrix. Here zeta value is 0.5. alternative parameters are used with to evaluation parameters.

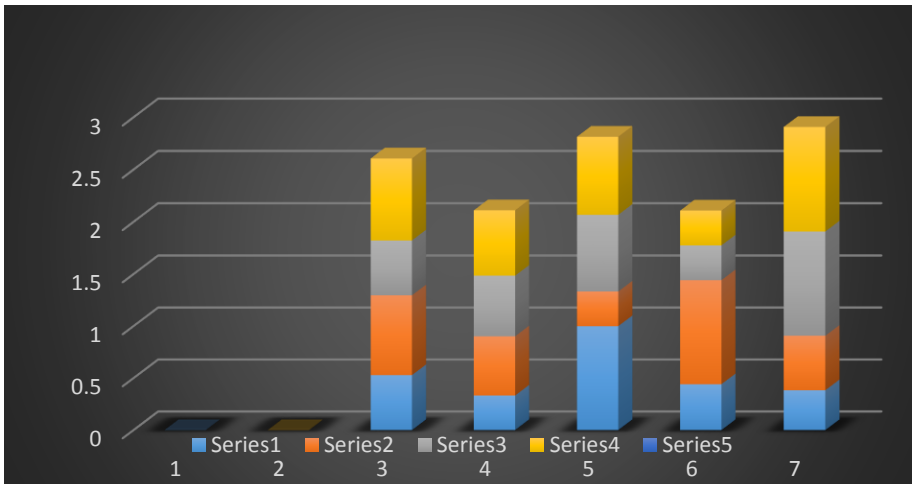

FIGURE 4. Grey Relation Coefficient

Figure 4 shows the grey relation coefficient matrix. Here zeta value is 0.5. alternative parameters are used with to evaluation parameters.

TABLE 5. GRG

GRG
0.651749
0.527744
0.703636
0.527141
0.727028

Table 5 shows the value of GRG. It is found by averaging the values on the rows.

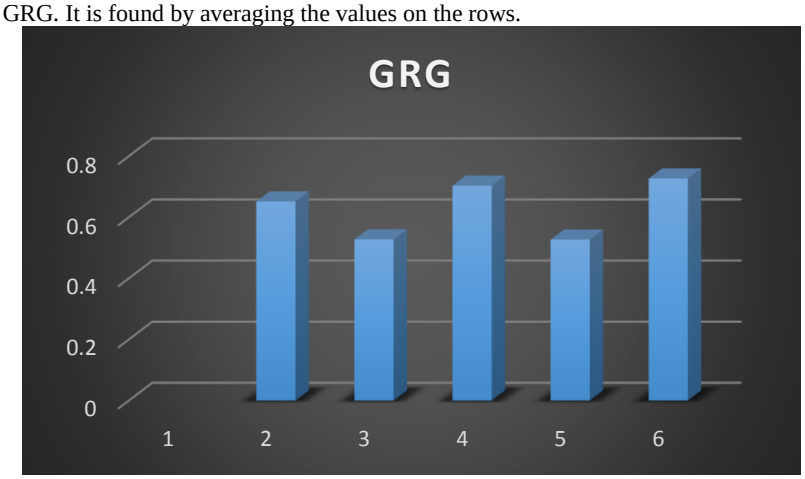

FIGURE 5. GRG

Figure 5 shows the GRG. Alternative and parameters are calculated.

TABLE 6. Rank

Rank
3
4
2
5
1

Here the rank is obtained. Analysis in 3rd rank, Design in 4th rank, development in 2nd rank, implementation in 5th rank, evaluation 1st rank.

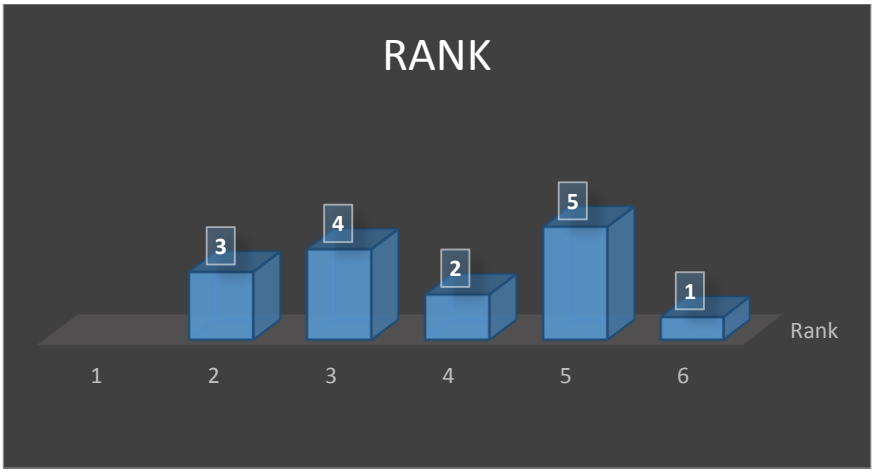

FIGURE 6. rank

Here the rank is obtained. Analysis in 3rd rank, Design in 4th rank, development in 2nd rank, implementation in 5th rank, evaluation 1st rank.

4. CONCLUSION

Finally, e-learning evaluation is critical in determining its success as an instructional tool. Evaluation assists educators and policymakers in making informed decisions regarding the integration and growth of e-learning programmers by analyzing aspects such as student happiness, knowledge gain, and skill development. The implementation of standardized assessment frameworks increases the consistency and reliability of e-learning initiative evaluation. However, because of the dynamic nature of e-learning and the requirement for continual feedback, it is critical to recognize the constraints and limitations of assessing it. Nonetheless, effective evaluation may enhance e-learning in order to deliver excellent educational experiences and suit learners' increasing demands in the digital world. To summarize, the grey relationship assessment (GRA) method is a beneficial way for analyzing complicated connections and making judgements in circumstances when information is imprecise or inadequate. GRA offers better analysis and estimate by employing grey numbers to reflect data uncertainty. This strategy assists decision makers in identifying relevant elements and variables inside a system, allowing them to priorities and make educated choices. GRA is used in a wide range of areas, particularly if data is scarce or dynamic. Its capacity to deal with ambiguous data makes it an invaluable tool for making choices and issue solving. The grey connection analysis approach, with its capacity to improve decision-making results, leads to improved productivity and efficacy in a wide range of fields, from finances and engineering to human resources and beyond. This method distinguishes itself by employing an experimental design strategy to assign weights of attributes and combining multiple MCDM estimate methods to produce a hybrid making decisions model. This approach assists the choice maker in reaching a sensible conclusion without the need for professional skills or substantial expertise. Ranking results obtained through numerous MCDM approaches are more trustworthy than those obtained through a single MCDM approach. The proposed solution is shown in a real-world situation including an IC packaging firm. Four further numerical examples are supplied to show the method's usefulness. In all situations, the suggested technique produced findings that were comparable to earlier research, confirming the system's validity and potential to address real-world MCDM challenges. The response spectrum method (RSM) is used to estimate the experimental results. The constructed model will assist the decision taker in making an informed choice. The suggested technique has three major benefits over previous MCDM systems. First, an experimental design approach is used to allocate weight. The DM can use this approach to calculate the relative relevance of each criterion statistically. The opinions of many specialists are vital in the process of making choices in traditional MCDM procedures. Many of DM's criterion judgements are subjective and hence inaccurate. Adjustments in attribute weights have a large impact on ranking outcomes. If the MCDM method's weighting process is not followed effectively, the weights are going to be created inaccurately, influencing the MCDM approach's conclusion. Comparative judgements do not call for a specialist to assign precise numerical values in our technique. This eliminates the subjective nature of human preferences in choice-making and decreases susceptibility to modifications in attribute weights. Consequently, rating outcomes become more equal and consistent. In addition, a model of regression is created to assist DMs in making judgements. An MCDM model is developed in our work utilizing a mixed the design of experiments and RSM regression technique. The alternative estimation technique may be simply 68 simplified after the formula for regression is developed.

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