Contemporaneity of Language and Literature in the Robotized Millennium
Vol: 1(5), 2019
REST Publisher
ISBN: 978-81-936097-3-6
Website: http://restpublisher.com/books/cllrm/

Appraisal of E learning websites using the EDAS Method

Shirsath Sanjay Dhanji
SSt College of Arts and Commerce, Maharashtra, India
Email : sanjayshirsath@sstcollege.edu.in

Abstract.
By changing the traditional method of learning and teaching, “the development of information and communication technology” has provided an innovative approach to education. Education professionals are aware of the potential of online technology, and the e-learning system is widely used globally to reap its benefits. Training, teaching, and learning are now much more accessible thanks to the development of e-learning technology during the past ten years. How to draw students to the education company's online learning services is currently their biggest difficulty. From the standpoint of MCDM issues, the assessment of E-learning websites may be taken into consideration. In this study, the EDAS approach is optimized for the challenge of evaluating and choosing E-learning websites. The final rank of alternative sites is calculated by using equations 8, 9 and 10. Her final rank of alternative sites is CLS1 is sixth, CLS2 is fifth, CLS3 is third, CLS4 is second, CLS5 is fourth and CLS6 is ranked first. The result of the analysis shows that CLS6 is the best C learning Website with an appraisal score (EDAS) of 0.82012. Online learning, Website Services, Functionality, usefulness, portability and MCDM.

Introduction

The World Wide Web is widely used now in a variety of sectors, including commerce, government, education, and entertainment. Particularly in the field of education, lessons have been designed and are now available online. E-learning is a tool that helps students increase their knowledge on their own. [1]. the majority of researchers and academic authorities now believe that a web-based system of education should be established. The word "e-learning" has a broad definition that includes multimedia-based training that can be accessed by students at their discretion through their computers and is delivered using a variety of instructional modalities. [2]. the terms "e-learning" and "web-based training," "online learning," "distributed learning," "internet-based learning," and "net-based learning" have also been interchanged. Learners, educators, and designers have a greater understanding of the capabilities of “web technology”,[3]. “E-learning” has drawn a lot of interest as a way to offer substitutes for conventional face-to-face, instructor-led education. According to IDC, and IT Business Analytics Researcher, “worldwide e-learning business” is currently worth $8 billion and is expected to reach $13 billion over the next five years. [4].Higher education institutions are undergoing a technological transformation as a result of the quick development of e-learning. “E-learning” is indeed a learner-centered system that provides students with the freedom to pursue their educational goals whenever, whenever, and as they see fit. [5]. The way that learning is organized should be in line with how schools manage their information. In addition to encouraging social interaction among instructors, it is important to support resource management that supports teaching and learning since it creates a setting for knowledge management activities. For instance, schools must take into account what kinds of IT resources are necessary to create offline and online settings for sharing as well as whether teachers can use them efficiently. [6] The utilization of the E-learning system has rapidly grown in recent years due to its many benefits, including lower costs, greater quality, faster delivery, etc. Cristina (2012) claims that learning management systems (LMS), "learning content management systems (LMCS)", and a set of tools are the three basic components that makeup e-learning systems. [7]. To manage the content of the Website Services are provided by LCMS, including teachers, students and administrators Teaching processes among multiple users and handling communications Tools represent services. The LMS is of online teaching activities All aspects of supervision Integrate. of e-learning websites as the demand increases, various e-learning Regarding the purpose of their selection of websites There is a need to develop an evaluation process. [8]Due to the widespread use of the online education system today, e-learning websites are being developed at a rate that makes it necessary to create an evaluation process that can assess a variety of e-learning websites. Society as a whole may greatly benefit from effective evaluation [9]. The evaluation of E-learning websites is an MCDM problem because numerous possibilities must be assessed using conflicting criteria. The decision criteria and alternatives are chosen as the first stage in addressing an MCDM challenge. To reflect the relative relevance of the relevant criteria, it is also required to calculate criteria weights. [10].Functionality, usefulness, and portability are important variables in this decision-making process, and their values are crucial. Lower values are suggested for the non-beneficial criteria personalization and learning community. For this investigation, six C learning sites were chosen as substitute parameters.

Materials and Methods

Keshavarz Ghorabaee et al. established the evaluation technique called EDAS “(Evaluation Based on Distance from Average Solution)” (2015). The distance from the average solution (AV) corresponds to the best alternative in the EDAS approach. [11,12]."The positive distance from average (PDA)”, and "the negative distance from average (NDA)" are the

first two measurements produced by the EDAS approach. These metrics can demonstrate the variation between each alternate option and the average answer. [13]. "Higher PDA values and lower NDA values" will therefore signify the ideal solution. The solution (alternative) is superior to the average solution if PDA and/or NDA values are greater or lower. [14,15].

Step 1: Select the characteristics that best define the decision possibilities for the given decision problem. The decision matrix X, which displays how various options perform with certain criteria, is created.

$$D = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ x_{31} & x_{32} & \cdots & x_{3n} \end{bmatrix} \quad (1)$$

Step 2: Weights for the criteria are expressed in equation 2.

$$w_j = [w_1 \quad \cdots \quad w_n], \text{where } \sum_{j=1}^{n}(w_1 \quad \cdots \quad w_n) = 1 \quad (2)$$

,

Step 3: The average result about all criteria must be computed using the formulas presented below, per the specification of the EDAS method:

$$AV_j = \frac{\sum_{j=1}^{n} k_{ij}}{n} \quad (3)$$

Step 4: The positive distance from the average (PDA) is expressed in equation 4

$$PDA_{ij} = \begin{cases} \frac{\max(0,(x_{ij} - AV_{ij}))}{AV_{ij}} & | \ j \in B \\ \frac{\max(0,(AV_{ij} - x_{ij}))}{AV_{ij}} & | \ j \in C \end{cases} \quad (4)$$

Step 5: Now we need to calculate $\text{For } i \in [1,m] \text{ and } j \in [1,n]$ the difference between each response from the ideal best,

$$S_i^+ = \sqrt{\sum_{j=1}^{n}(N_{ij} - A_j^+)^2} \quad (5)$$

Step 6: "The negative distance $\text{For } i \in [1,m] \text{ and } j \in [1,n]$ from average (NDA)"is expressed in equation 5

$$NDA_{ij} = \begin{cases} \frac{\max(0,(AV_{ij} - x_{ij}))}{AV_{ij}} & | \ j \in B \\ \frac{\max(0,(x_{ij} - AV_{ij}))}{AV_{ij}} & | \ j \in C \end{cases} \quad (5)$$

Step 7: The weighted sum of the positive and the negative distance from the average solution for all alternatives is normalized using equation 2 multiplied by 4 and 5 respectively.

Step 8: Weighted sums of the positive and the negative distance are calculated by the equation

$$SP_i = \sum_{j=1}^{m} w_j \times PDA_{ij} \quad (6)$$
$$SN_i = \sum_{j=1}^{m} w_j \times NDA_{ij} \quad (7)$$

Step 9: The weighted sum of the positive and the negative distance from the average solution for all alternatives is normalized using equations 8 and 9.

$$NSP_i = \frac{SP_i}{max_i(SP_i)} \quad (8)$$

$$NSN_i = 1 - (\frac{SN_i}{max_i(SN_i)}) \quad (9)$$

Step 10: The average of the normalized weighted sum of the positive and negative distances from the average solution for all alternatives is used to determine the final appraisal score (ASi) for all alternatives.

$$AS_i = \frac{(NSP_i + NSN_i)}{2} \quad (10)$$

where 0 ≤ ASi ≤ 1. The alternative with the highest appraisal score is selected as the best choice among the other selective alternatives.

In this decision problem, usability (C1), reliability (C2), and portability (C3) are beneficial criteria whose values are highly required. personalization (C4) and learning community (C5) are non-beneficial criteria for which lower values are preferred. Six C learning sites CLS1, CLS2, CLS3, CLS4, CLS5 and CLS6 were chosen as alternative parameters for this analysis. Usability: Usability is a fundamental criterion for assessing e-learning systems and technology. Usability equals quality and prioritizes the users' actual demands. Therefore, it is worthwhile to investigate the usability and how it relates to or contributes to the learning process. [16]. Reliability: Because online courses provide students with total control over their education, they can work at their own pace. When attending classes online, students perform their work more quickly and retain more information than when taking them in person [17].Portability: Higher education is increasingly merely a step in the process of lifetime learning. Because learning is portable, "blended learning," which combines physical and virtual mobility and frees the learner from the place- and time-based restrictions, is required [18]. Personalization: According to data gathered about the user and the context, the personalization process in e-learning systems can involve tailoring learning strategies, content, feedback, navigation, or evaluation to meet the needs of specific users. To customize e-learning, a variety of methodologies and methods could be applied [19].learning community: "Online Learning Environments" is their degree program with jobs in mind Often with experts who undertake the design. Knowledgeable Different work of your group by teachers You will also be guided by experiences as such, it is a perfect setting for brainstorming. [20].

Analysis and Discussion

TABLE 1. Decision matrix

	usability	**reliability**	**portability**	**personalization**	**learning community**
CLS1	3.20	4.06	4.26	4.06	4.26
CLS2	7.40	7.20	7.80	8.40	8.20
CLS3	5.80	5.40	6.20	4.20	5.20
CLS4	8.87	8.40	8.87	7.80	8.87
CLS5	6.40	5.80	7.60	6.60	6.40
CLS6	8.60	8.53	8.87	8.33	8.00

Table 1 shows data forthe Decision matrix for the performance of the E-learning websites, usability (C1), reliability (C2), and portability (C3) are beneficial criteria whose values are highly required. personalization (C4) and learning community (C5) are non-beneficial criteria for which lower values are preferred. Six C learning sites CLS1, CLS2, CLS3, CLS4, CLS5 and CLS6 were chosen as alternative parameters for this analysis.

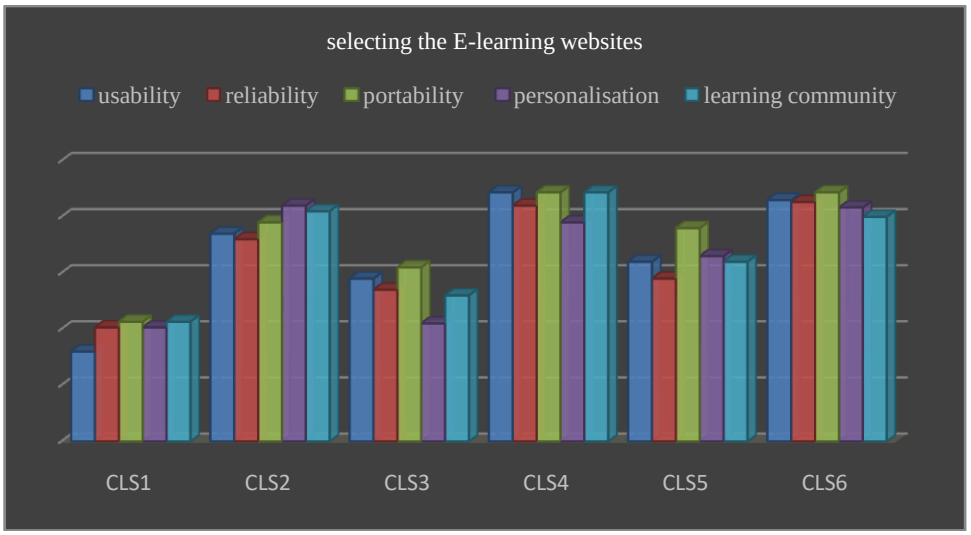

FIGURE 1. C learning sites

Figure 1 represents the data forthe Decision matrix used in this paper. usability (C1), reliability (C2), and portability (C3) are beneficial criteria whose values are highly required. personalization (C4) and learning community (C5) are non-beneficial criteria for which lower values are preferred. Six C learning sites CLS1, CLS2, CLS3, CLS4, CLS5 and CLS6 were chosen as alternative parameters for this analysis.

TABLE 2. PDA

0	0	0	0.381569	0.375519
0.102558	0.096725	0.073394	0	0
0	0	0	0.360244	0.237723
0.321579	0.279513	0.220642	0	0
0	0	0.045872	0	0.061813
0.281351	0.299315	0.220642	0	0

Table 2 displays the PDA. It is calculated using equation 4.

TABLE 3. NDA

0.523218	0.381569	0.413761	0	0
0	0	0	0.279513	0.202052
0.135833	0.177456	0.146789	0	0
0	0	0	0.188119	0.300269
0.046437	0.116527	0	0.005331	0
0	0	0	0.26885	0.172734

Table 3 displays theNDA. It is calculated using equation 4.

TABLE 4. Weight

0.2	0.2	0.2	0.2	0.2
0.2	0.2	0.2	0.2	0.2
0.2	0.2	0.2	0.2	0.2
0.2	0.2	0.2	0.2	0.2
0.2	0.2	0.2	0.2	0.2
0.2	0.2	0.2	0.2	0.2

Table 4 shows the weights distributed to the alternatives. Here 0.2 is equally distributed among the evaluation criteria usability (C1), reliability (C2), portability (C3),personalization (C4) and learning community (C5).The sum of weight distributed among the evaluation parameters is one.

TABLE 5. Weighted PDA

Weighted PDA					**SPi**
0	0	0	0.076314	0.075104	0.151418
0.020512	0.019345	0.014679	0	0	0.054535
0	0	0	0.072049	0.047545	0.119593
0.064316	0.055903	0.044128	0	0	0.164347
0	0	0.009174	0	0.012363	0.021537
0.05627	0.059863	0.044128	0	0	0.160262

Table 5 shows the data values of the Weighted Positive Distance from the Average and the sum of the Weighted Positive Distance from the Average. It is calculated using equation 6.

TABLE 6. Weighted NDA

Weighted NDA					**SNi**
0.104644	0.076314	0.082752	0	0	0.26371
0	0	0	0.055903	0.04041	0.096313
0.027167	0.035491	0.029358	0	0	0.092016
0	0	0	0.037624	0.060054	0.097678
0.009287	0.023305	0	0.001066	0	0.033659
0	0	0	0.05377	0.034547	0.088317

TABLE 7. NSPi and NSNi value

	NSPi	NSNi
CLS1	0.92133	0
CLS2	0.331832	0.634777
CLS3	0.727689	0.651072
CLS4	1	0.629602
CLS5	0.131045	0.872364
CLS6	0.975142	0.665099

Table 7 shows values of NSPi and NSNi values calculated from Tables 5 and 6 respectively. It is calculated using equations 8 and 9.

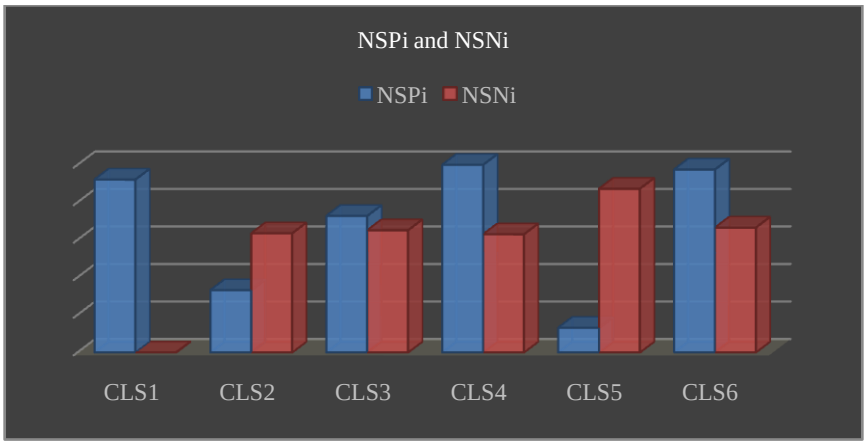

FIGURE 2. NSPi and NSNi value

Figure 2 shows a graphical representation of values of NSPi and NSNi values calculated from Tables 5 and 6 respectively. It is calculated using equations 8 and 9.

TABLE 8. ASi

	ASi
CLS1	0.460665
CLS2	0.483304
CLS3	0.68938
CLS4	0.814801
CLS5	0.501704
CLS6	0.82012

Table 8 shows the final appraisal score of C Learning sites taken as alternatives calculated by using equations 8,9 and 10. Here final appraisal score of alternatives sites CLS1 is 0.460665, CLS2 is 0.483304, CLS3 is 0.68938, CLS4 is 0.814801, CLS5 is 0.501704and CLS6 is 0.82012.

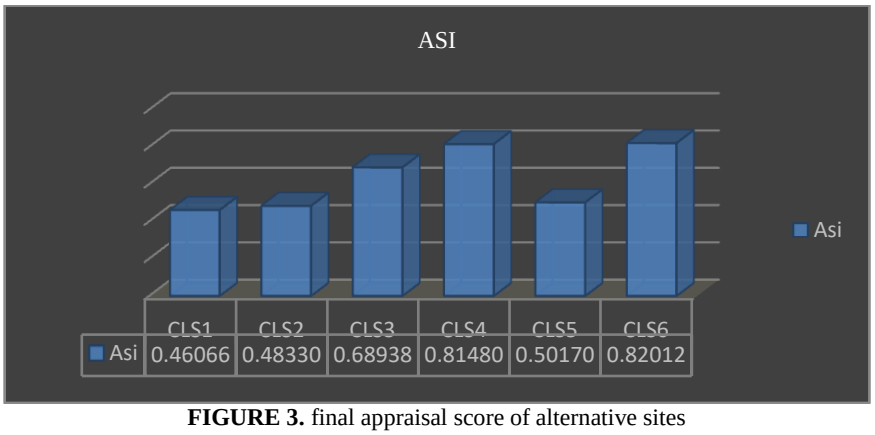

FIGURE 3. final appraisal score of alternative sites

Figure 3 illustrates the final appraisal score of C Learning sites taken as alternatives calculated by using equations 8,9 and 10. Here final appraisal score of alternatives sites CLS1 is 0.460665, CLS2 is 0.483304, CLS3 is 0.68938, CLS4 is 0.814801, CLS5 is 0.501704and CLS6 is 0.82012.

TABLE 8. Rank

	Rank
CLS1	6
CLS2	5
CLS3	3
CLS4	2
CLS5	4
CLS6	1

Table 9 shows the final rank of alternative sites calculated by using equations 8,9 and 10. Here final rank of alternative sites is CLS1 is sixth, CLS2 is fifth, CLS3 is third, CLS4 is second, CLS5 is fourth and CLS6 is ranked first.

TABLE 4. The rank of alternative sites

Figure 4 shows a graphical representation of the final rank of alternative sites calculated by using equations 8,9 and 10. Herefinal rank of alternative sites is CLS1 is sixth, CLS2 is fifth, CLS3 is third, CLS4 is second, CLS5 is fourth and CLS6 is ranked first. The result of the analysis shows that CLS6 is the best C learning Website with an appraisal score (EDAS) of 0.82012.

Conclusion

For academic organizations and people who are either providing or receiving education, the spread of online applications such as E-learning websites has created new opportunities as well as new obstacles. Due to the many advantages offered by the concept of online learning, such as the ability to study at any time and location, e-learning websites have grown in popularity over the past few decades. Many organizations nowadays have created websites to disseminate knowledge and skills in the field of education. The issue of E-learning evaluation and selection is brought on by the rapid expansion of E-learning use. From the standpoint of multi-criteria decision-making (MCDM) issues, the assessment of E-learning websites may be taken into consideration. This study addresses the issue of evaluating and choosing E-learning websites With the EDAS method. This analysis shows the final rank of alternative sitesCLS1 is sixth, CLS2 is fifth, CLS3 is third, CLS4 is second, CLS5 is fourth and CLS6 is ranked first. The result of the analysis shows that CLS6 is the best C learning Website with an appraisal score (EDAS) of 0.82012.

References:

1. Pruengkarn, Ratchakoon, PrasongPraneetpolgrang, and AnongnartSrivihok. "An evaluation model for e-learning Websites in Thailand University." In *Fifth IEEE International Conference on Advanced Learning Technologies (ICALT'05)*, pp. 161-162. IEEE, 2005
2. Lu, His-Peng, Su-Houn Liu, and Hsiu-Li Liao. "Factors influencing the adoption of e-learning websites: An empirical study." *Issues in Information Systems* 6, no. 1 (2005): 190-196.
3. Thowfeek, Mohamed Hussain, and Mohamed Nainar Abdul Salam. "Students' assessment on the usability of E-leaming websites." *Procedia-Social and Behavioral Sciences* 141 (2014): 916-922.
4. Liao, Hsiu-Li, and Hsi-Peng Lu. "The role of experience and innovation characteristics in the adoption and continued use of e-learning websites." *Computers & Education* 51, no. 4 (2008): 1405-1416.
5. Tan, Paul Juinn Bing. "Applying the UTAUT to understand factors affecting the use of English e-learning websites in Taiwan." *Sage Open* 3, no. 4 (2013): 2158244013503837.
6. Lim, Chang Joo, and S. Lee. "Pedagogical usability checklist for ESL/EFL e-learning websites." *J. Convergence Inf. Technol.* 2, no. 3 (2007): 67-76.
7. Garg, Rakesh, Ramesh Kumar, and Sandhya Garg. "MADM-based parametric selection and ranking of E-learning websites using fuzzy COPRAS." *IEEE Transactions on Education* 62, no. 1 (2018): 11-18.
8. Jain, Dimpal, Rakesh Garg, Ashu Bansal, and K. K. Saini. "Selection and ranking of E-learning websites using weighted distance-based approximation." *Journal of Computers in Education* 3, no. 2 (2016): 193-207.
9. Garg, Rakesh. "Optimal selection of E-learning websites using multiattribute decision-making approaches." *Journal of Multi-Criteria Decision Analysis* 24, no. 3-4 (2017): 187-196.
10. Khan, Noor Zaman, Talhah Shamshad Ali Ansari, Arshad Noor Siddiquee, and Zahid A. Khan. "Selection of E-learning websites using a novel Proximity Indexed Value (PIV) MCDM method." *Journal of Computers in Education* 6, no. 2 (2019): 241-256.
11. Kahraman, Cengiz, Mehdi Keshavarz Ghorabaee, EdmundasKazimierasZavadskas, SeziCevikOnar, Morteza Yazdani, and

12. BasarOztaysi. "Intuitionistic fuzzy EDAS method: an application to solid waste disposal site selection." *Journal of Environmental Engineering and Landscape Management* 25, no. 1 (2017): 1-12.
13. Zavadskas, EdmundasKazimieras, ŽeljkoStević, ZenonasTurskis, and Milovan Tomašević. "A novel extended EDAS in Minkowski Space (EDAS-M) method for evaluating autonomous vehicles." *Studies in Informatics and Control* 28, no. 3 (2019): 255-264.
14. Matsushima, T., S. Fujiwara, S. Nagata, K. Fujii, M. Fukui, K. Kitamura, and K. Hasuo. "Surgical treatment for paediatric patients with moyamoya disease by indirect revascularization procedures (EDAS, EMS, EMAS)." *Acta neurochirurgica* 98, no. 3 (1989): 135-140.
15. Ecer, Fatih. "Third-party logistics (3PLs) provider selection via Fuzzy AHP and EDAS integrated model." *Technological and Economic Development of Economy* 24, no. 2 (2018): 615-634.
16. Ardito, Carmelo, Maria De Marsico, Rosa Lanzilotti, Stefano Levialdi, Teresa Roselli, Veronica Rossano, and Manuela Tersigni. "Usability of e-learning tools." In *Proceedings of the working conference on Advanced visual interfaces*, pp. 80-84. 2004
17. Sung, Yao-Ting, Kuo-En Chang, and Wen-Cheng Yu. "Evaluating the reliability and impact of a quality assurance system for E-learning courseware." *Computers & Education* 57, no. 2 (2011): 1615-1627
18. Collis, B. A., and Italo PF De Diana. "Portability and networked learning environments." *Journal of computer assisted learning* 10, no. 2 (1994): 125-136.
19. Yilmaz, Ramazan. "Knowledge sharing behaviors in e-learning community: Exploring the role of academic self-efficacy and sense of community." *Computers in Human Behavior* 63 (2016): 373-382

