The Impact of E-learning system using Rank-based Clustering Algorithm (ESURBCA)

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ABSTRACT
E-learning is emerging as the new paradigm of modern education. Most of the e-learning systems have limitations such as scarcity of content, lack of intelligent search and context sensitive personalization problems, which are the challenging tasks for researchers. This motivated the author to take up this problem and the method implemented through this work suggests the instructors to use the combination of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) was designed. The main aim of the model developed is to get consistency in content delivery, quality content in learning materials, students self-learning concept, and performance improvement in their examination. A study has been conducted During June 2013 to September 2013, the author collected samples of 1631 from final year and Second year of BCA, B.SC and B.Sc-IT students were trained through e-learning system architecture and the objectives of this study is 1. To measure the effectiveness of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) among the students of Mercury College of arts and science And Sankara arts and Science College in concepts of Programming in JAVA Course. The newly designed E-learning System using Rank-Based Clustering Algorithm (EUSRBCA)shows an improvement over the existing systems with better results. From the various evaluations carried out, the performance of the system found to be good comparatively to other systems in e-learning domain.

1. INTRODUCTION
The concept of e-learning is expected to develop as technology advances. In order to boost the gains of e-learning market, the learning components are developed [16] that interoperate and co-operate. The great advantages of e-Learning include liberating interactions between learners and instructors, or learners and learners, from limitations of time and space through the asynchronous and synchronous learning networks.

2. RELATED WORK OF E-LEARNING
This section presents a literature survey of the approaches used in e-learning environments. [15]Describes learning styles as the preferred ways through which learners interact with and process information in learning environments. Different views of learning styles were and are still discussed in the literature. Behaviorism, a reductionist view of human behavior, dominated the field in the first half of the 20th century. It was called reductionist because it used a black box approach based on empiricism, but such a simplified view left much to be desired. Rogers points out that "learning includes goals, purposes, intentions, choice and decision-making, and it is not at all clear where these elements fit into the learning cycle" [12].online learning has advantages over traditional face-to-face education [8], concerns include time, labor intensiveness, and material resources involved in running e-Learning environments. The costly high failure rate of e-Learning implementations discussed by [2] deserves attention from management and system designers.

Table 1.1 Comparative study of existing Data mining based e-learning methods

Learning System	Theory Basis	Instructional Emphasis	Results
Data Mining In The E-Learning Domain (Developed By Margo Hanna In 2004).	Awareness of the knowledge economy has come a growing consciousness that **HE** (Higher Education) a large industry or economic sector.	Agent based approaches have software systems that perform the content mining. Search engines belong to this class as do intelligent search engines, information filtering and personalized web agents.	Online events are becoming a promising area for research and development when the business in education is growing impressively.
Predicting Relationship Between Online Questions Theme And Final Grade (Developed ByAbdous, M., W., &yen, C.-J in2012).	**EDM** (Educational Data Mining) And regression analysis to analyze Live Video stream **(LVS**) students online learning behaviours And their performance in their	Focused on understanding Live video Streaming (LVS) students learning behaviours, their interaction and their learning outcomes.	Students learning behaviours, ranging from active participation and interaction with the instructor to a lack of participation or even of

	course.		attendance.
Mining Educational Data to improve students' performance(Developed by M.abu Tair,Alaa M	Educational data mining (**EDM)** to improve graduate students performance and overcome the problem of low grade to graduate students**.**	Data preparation and preprocessing of the data set and to get better input data for data mining techniques some preprocessing for the collected data before loading the data set to the data mining software. here we are used some data mining techniques such as association rules, classification,clusteringand outlier detection used two ways i)Distance-Based Approach and ii)Density based approach.	Data mining can be used in higher education particularly to improve graduate students performance. Graduate students data collected from college of science technology in khanyounis.the data include 15years period(1993-2007).
Using data mining for e-learning decision making(Developed by David Monk in2005)	Learners followed when offered the course in custom Virtual Learning Environment(VLE) which is structured by Task, course material and learning resources. Quickly became	The custom VLE comprises a number of dynamic active server pages (ASP) a frameset, style sheet and GUI graphics. The course content is offered via Three view-materials, tasks and library resources.	The findings that indicate 80% of users accumulate less than one hour a week with the course materials VLE with around two-thirds of all users acquiring less than
	clear that students were spending little time with the course materials online and the time spent each pages was usually less than 20 seconds.		30 minutes
Data Mining - based E-learning system (DMBELS) Developed by M.Prema and S.Prakasam in2013)	The method implemented through this work suggests the instructors to use the combination of the data mining based e-learning system (DMBELS) was designed. The main aim of the model developed is to get consistency in content delivery, quality content in learning materials, students self-learning concept, and performance improvement in their examination. To measure the effectiveness of data mining technique based e-learning	The text based search engine is created, which is capable of extracting the documents from open source learning objects. Document retrieval is based on the occurrence of computer application based terminologies and keywords based on the user search text.	The study results show that the systematic use of Data mining based e-learning system as a part of the instructional design process has improved the quality of teaching and learning.

	system (DMBELS) among the students of SCSVMV University in concepts of First Aid awareness course.		

3. ARCHITECTURE OF E-LEARNING SYSTEM

In this work, architecture of e-Learning the combination of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA). The Rank-Based Clustering Algorithm is capable of retrieving computer application based databases from the www and they are clustered based on the relativeness of the document to the user search. Clustering is based on page ranking which represents the level of relativeness for the retrieved clustered documents. Document retrieval is based on the occurrence of the computer application based terminologies and keywords based on the user search text.

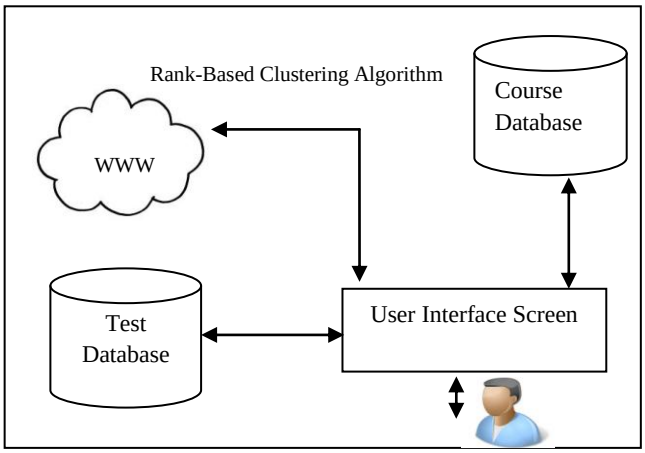

Fig 1.1 Architecture of E-Learning System using Rank-Based Clustering Algorithm

The below is the algorithm for Rank-Based Clustering Algorithm used in the Architecture of e-learning system
Step1: Enter the searching text

Step2: Analyzed keyword and terminology from text

Step3: The relation set to identify the keyword from text

Step4: Through Word Net extract AlterNet keyword and terminology, store to the relation set list

Step5: The relation list, displayed related Docs from OSDBS

Step6: Extracted Docs stored to temporary folder

Step7: Doc list organizer rank and clustering the Docs on Rank based score

Step8: Rank score evaluation determinate was direct match keyword and found direct match terminologies.

4. PERFORMANCE EVALUATION OF E-LEARNING

Data mining-based e-learning system environment combined the pedagogical, communication and software tools integrated into one system that is used to promote learning. This helps to create an optimal knowledge building and learning environment for students.

A study has been conducted to measure the effectiveness of e-learning system using Rank-Based Clustering Algorithm among the students of Mercury College of arts and science And Sankara arts and Science College in concepts of Java programming course.

The purpose of the study was twofold: (i) to measure the effectiveness of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) (ii) To find the student effectiveness (test mark) of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) among the students of Mercury College of arts and science And Sankara arts and Science College in concepts of Java programming course based on their marks before and after the e-learning course. This paper presents how the collected data are analyzed through appropriate statistical techniques and the results of data analysis.

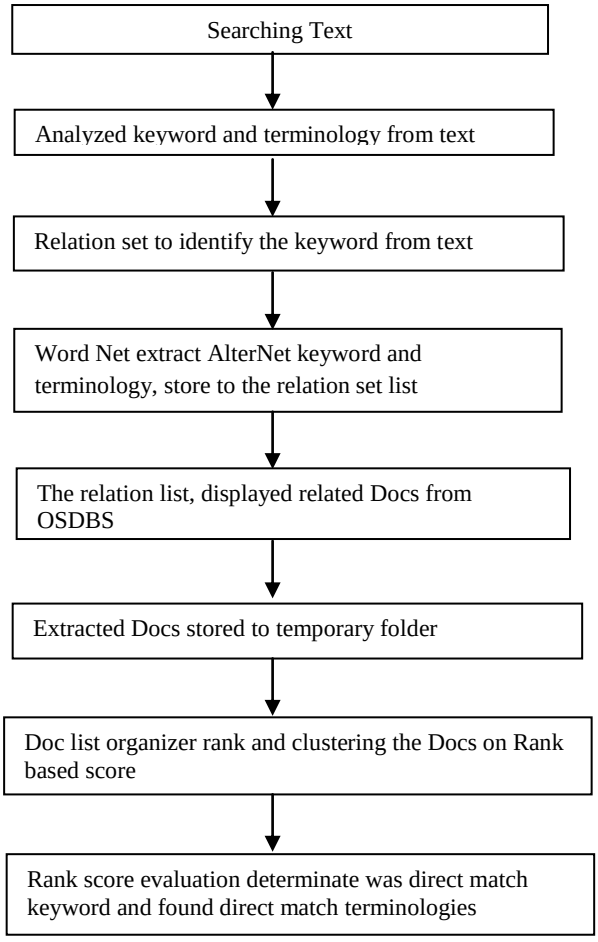

Fig 1.2 Rank-Based Clustering Algorithm

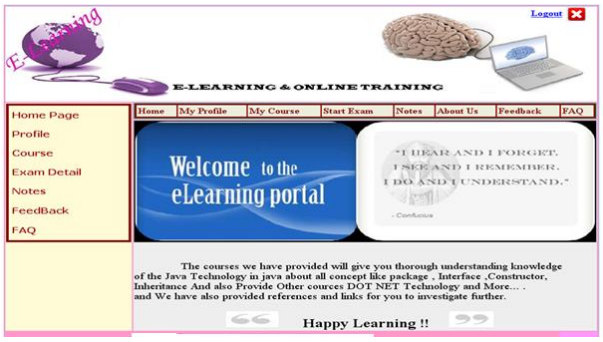

Fig 1.3 Implementing the Architecture of E-Learning System for Java Programming

4.1 Performs Validation of E-learning system

To find the student effectiveness (test mark) of To measure the effectiveness of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) among the students of Mercury College of arts and science And Sankara arts and Science College in concepts of Programming in JAVA Course based on their marks before and after the e-learning course during June 2013 to September 2013, the author collected samples of 1631 from final year and Second year of BCA,B.SC and B.Sc-IT students trained through e-learning system architecture.

Table 1.2 Number of respondents based on Course

		Details of the learners							Total
		B.SC – CS III	**B.SC-IT III**	**BCA III**	**B.SC – CS II**	**B.SC-IT II**	**BCA II**	**B.SC – CS II**	
source of learning	Group A (TTM)	126	94	126	65	128	131	134	804
	Group B (MAABELS)	125	93	135	72	129	138	135	827
Total		**251**	**187**	**261**	**137**	**257**	**269**	**269**	**1631**

4.2 Hypothesis Tested

4.2.1 Research Hypothesis (H1)

There will be a significant difference in the opinion and preferences of students between the traditional teaching method (TTM) and E-learning System Using Rank-Based Clustering Algorithm Null Hypothesis (Ho) there will not be a significant difference in the opinion and preferences of students between the traditional teaching method (TTM) and E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) based on factors.

Normally ANOVA test requires the independent and dependent variables to test the significance. It is further classified into one-way and multi [MANOVA] analysis. The table 1.3 shows the significant difference in the opinion and preferences of students between the traditional teaching method (TTM) and E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) based on factors.

Table 1.3 ANOVA Table

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**	**Remarks**
Feedback about the performance in the course	Between Groups	76.293	1	76.293	370.362	.001	S
	Within Groups	335.568	1629	.206			
	Total	411.861	1630				
The instructors interest in your learning	Between Groups	48.368	1	48.368	222.475	.001 2	S
	Within Groups	353.940	1628	.217			
	Total	402.307	1629				
Utilization of class time	Between Groups	127.978	1	127.978	746.235	.002 1	S
	Within Groups	279.198	1628	.171			
	Total	407.175	1629				
The instructors overall organization of the course	Between Groups	36.125	1	36.125	164.010	.001 4	S
	Within Groups	358.587	1628	.220			
	Total	394.712	1629				
Continuity from one class meeting to the next meeting	Between Groups	113.906	1	113.906	631.777	.001 7	S
	Within Groups	293.520	1628	.180			
	Total	407.426	1629				
The instructors assessment of your progress in the course	Between Groups	112.027	1	112.027	605.508	.002 8	S
	Within Groups	301.202	1628	.185			
	Total	413.229	1629				
Learning materials used in the courses	Between Groups	66.353	1	66.353	258.050	.002 2	S
	Within Groups	418.610	1628	.257			

		Sum of Squares	df	Mean Square	F	Sig.	Remarks
	Total	484.963	1629				
	Within Groups	351.507	1628	.216			S
	Total	395.691	1629				
	Within Groups	341.811	1629	.210			S
	Total	375.175	1630				
	Within Groups	351.781	1629	.216			S
	Total	406.770	1630				
Availability to assist students in or outside of class	Between Groups	105.558	1	105.558	571.215	.001	
	Within Groups	301.032	1629	.185			
	Total	406.590	1630				S
Simulation of interest in the course	Between Groups	64.919	1	64.919	270.568	.002	
	Within Groups	390.858	1629	.240			S
	Total	455.777	1630				
Facilitation of learning	Between Groups	27.895	1	27.895	128.420	.0020	
	Within Groups	353.843	1629	.217			S
	Total	381.738	1630				
	Within Groups	363.517	1629	.223			S
	Total	405.571	1630				

Depending on the Feedback about the performance in the course, among the traditional teaching method (TTM) and E-learning System Using Rank-Based Clustering Algorithm (ESURBCA), there is significant difference exist among the learners. It is proved through the table 1.3 that significance is 0.001 which is less than 0.05. So the Null Hypothesis is rejected.

There is a significant difference between the traditional teaching method (TTM) and E-learning System Using Rank-Based Clustering Algorithm (ESURBCA), among the learners, in the following factors (Fig 1.3), Feedback about the performance in the course, The instructors interest in your learning, The instructors assessment of your progress in the course Utilization of class time, The instructors overall organization of the course, Continuity from one class meeting to the next meeting, Learning materials used in the courses, Availability to assist students in or outside of class was, Simulation of interest in the course was and Facilitation of learning , are in favour of E-learning System Using Rank-Based Clustering Algorithm (ESURBCA) method at the level of significance of 0.05.

Table 1.4 Mean Values

S.NO	FACTORS	TTM	ESURBCA
1	Feedback about the performance in the course	2.127	2.407
2	The instructors interest in your learning	2.16	2.395
3	Utilization of class time	2.085	2.428
4	The instructors overall organization of the course	2.197	2.41
5	Continuity from one class meeting to the next meeting	2.09	2.416
6	The instructors assessment of your progress in the course	2.081	2.405
7	Learning materials used in the courses	2.143	2.408
8	Availability to assist students in or outside of class was	2.104	2.422
9	Simulation of interest in the course was	2.143	2.406
10	Facilitation of learning was	2.223	2.418

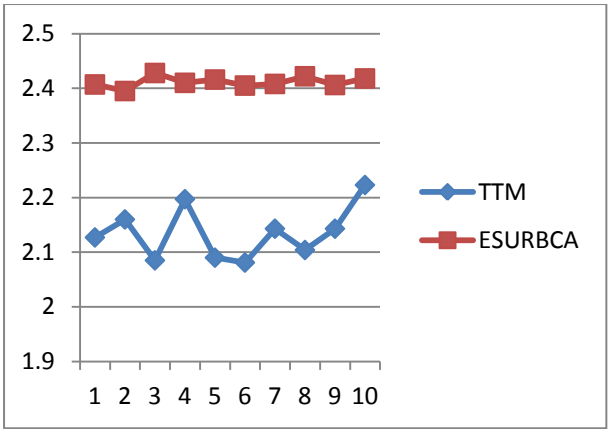

Fig 1.4 Effectiveness of ESURBCA

5. CONCLUSION

The concepts of e-learning system have been outlined. E-learning is considered in the context of formally and systematically organized teaching and learning activities, in which the instructor and the learner(s) use ICT to facilitate their interaction and collaboration. The use of data mining based e-learning system will definitely impact the quality of the education that is delivered and the deliverability of information through knowledge and information sharing. The newly designed E-learning System using Rank-Based Clustering Algorithm (EUSRBCA)shows an improvement over the existing systems with better results. From the various evaluations carried out, the performance of the system found to be good comparatively to other systems in e-learning domain.

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