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RECOMMENDATION OF LEARNING OBJECTS BASED ON LEARNING STYLE

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Abstract: In recent years e-learning is an asynchronous or synchronous accomplishment. It has a global reach, can be accessed by people around the worlds. For learning mobile devices, computers can be used such online courses literally in the hands of the world who need them, at any time. Online Learning results in cost reduction of organization which replace their traditional instructor commanded teaching. Online resources maintain consistency and quality in delivering content. However, most of the e-Learning systems had not altered as per learner's interest. Even today e-Learning platforms are providing the same educational content which could not relevant to learner's search interest. So there is a need to create specific strategies that will build personalization of e-Learning system. Recommended e-Learning system will gather student's learning preferences from the different discussion and provide learning objects.

Index Terms **- e-Learning, Learning Objects, Learning Style, Ontologies**

I. INTRODUCTION

Due to advancement in technology the requirement of providing e-learning material has increased day by day. For the construction of it, we need to deliberate learner's requirements, and the learning resources and data could be suitably adjusted to satisfy those requests. There are three models of education processes such as a. Models as scientific tools: It is used for understanding and forecasting a particular aspect of an educational situation, b. Models as a component: It corresponds to characteristics of learning and teaching methods and uses as a component of educational objects and c. Models as a basis for the design of educational artifacts: It assists in developing design methodologies and system components by compelling the range of tools that strength capability of learning by learners. The goal of developing an e-Learning system is to generate the learning style of the learner and recommends learning object to them for a better understanding of the concept.

II. EXISTING METHODOLOGIES AND ANALYSIS

There are many procedures and approaches used for construction for personalized e-Learning system; this work summarizes a few of the techniques and approaches.

In paper [1] they have considered textbook resources for learning, the collection of near about 100 text resources used for classification. From classification cluster analysis was conducted to identify significant clusters of learning resources. Further study shows that these learning resources are suitable for low order to mid order learner's. However, for high order learner system needs specific advancements, such as evaluate and create extensive interaction and collaboration among learners in e-Learning platform.

In paper [2], represent e-learning system for personalization of learning content. It is an adaptive e-Learning system for proving most suitable content to the learner. Based on parameters such as knowledge level of the learner, Learning style, interactive level, complexity level of learning objects this system provides suitable content to students. Personalizing e-Learning process had done through a genetic algorithm. Research work improves genetic algorithm efficiency by providing compatibility of learning objects in large sample space. Ultimately it provides a reduction in sample space with better chromosomes. Improved genetic algorithm generates better results as compared to standard algorithms.

E-Learning system developed in the paper [3], considered knowledge level and learners need for personalization. For recommendation of learning resources social tagging and collaborative techniques were used. This system provides tag based guidance by analyzing the suitability of various methods as a result tensor factorization techniques most appropriate for the proposal. For reducing sample space, they used the cluster based approach on learning style. It ultimately reduces time and memory and provided a quality recommendation.

Work Presented in the paper [4] used cased based reasoning approach for personalized e-Learning system. In general Case-based reasoning procedure is as follows:

a. Retrieve the most analogous case (or cases) by matching the case to the reference library of earlier cases;
b. Reuse the retrieved case to attempt to resolve the present problem;
c. Revise and adjust the future solution if needed;

d. Retain the final explanation as part of a new trial.

Paper [5] summarized different techniques for personalization. If we are talking about computing context-aware system comes into existence, these system works on mobile devices and sense their physical location and capture indivisible behavior. In general, context is nothing but any information can illustrated person; place or object. These system provides us with services as per the present context and infers the meaning using different machine learning algorithm. Cognitive state and learning preferences are captures for building learning system; cognitive psychology deals with how people psychologically characterize information processing. There is an investigation of internal conceptual procedures of thought such as memory, problem-solving, and visual processing. The ontologies are a way to model knowledge more precisely as knowledge bases. Ontologies represent concepts of the specific domain like vocabulary. Personalization has done through demonstrating educational area using ontologies, learner mental state and likings and clarification is provided to show the relation among learning objects with metadata and semantics connection between learning object and ontology element. Pedagogy offers a theory to gain knowledge and detect how to instruct, its primary goal range from general schooling to the vocational education. In education position of the instructor is formal and enduring. It based on the description of the semantic pieces of evidence and web facilities of learning element and correlation between web facilities and learning elements. An adaptive, personalized e-learning personalized learning object recommender system supports users by providing them recommendations based on learning objects within the course and considering learning object visited by other users.

III. PROPOSED METHODOLOGY AND DESIGN

The design of the learning system compromises into different tasks. For identifying learners behavior,this system offers the question-based on specific information. Design of base website for programming tutorials includes registration, login of that particular student to the system. Contents of programming tutorials represented by different learning objects such as text, video, audio. Based on learner's learning style, this system recommends learning object to the students. Once the learning of specific topic done by students, learner opt for a test.Test performance and learning object used by learner stored in the database of the system entitled it has weblog data of the student's. Table 1 shows the basic structure of the proposed system

Table 1.Basic Structure of the Proposed System

<table>
<tr><th colspan="5">Register</th></tr>
<tr><th colspan="5">Login</th></tr>
<tr><th>E-Learning Content</th><th>Learning Objects</th><th>Test</th><th>Web Log</th><th>Recommendation</th></tr>
<tr><td>Control Structure
If
If-else
Switch
For
While
Do-while</td><td>Text, Audio, The video, animation, flowchart, Examples with Explanation, Graph</td><td>Based on the selected control structure</td><td>Record the path of learner and learning object used.</td><td>Recommendations of learning objects to student's constructed on generated Learning Style.</td></tr>
</table>

3.1 GENERATION OF LEARNING STYLE

For accessing the content learners need to register to the system, the registered user can answer simple questionnaires set. Proposed learning system uses three types of learning style. These are Visual, Auditory, and Kinesthetic.

Sample Questions to identify learners' behavior from student's perspectives are as follows

1. What I generally do while operating new equipment?
A. First I read the instructions
B. I take note of a description given by somebody who has used it before
C. I will go ahead and manage it and figure out after using that equipment
2. Which guideline is better for me related to directions while traveling?
A. I will use a map
B. I will ask the nearby person for directions
C. I will follow my instincts and possibly use a GPS
3. While cooking new food, I would like to :
A. Follow a printed procedure

B. Take advice from a friend for the preparation
C. Try cooking and test it

If more numbers of 'A' are in the answer then Learning style is "Visual."
If more numbers of 'B' are in the answer then Learning style is "Auditory."
If more numbers of 'C' are in the answer then Learning style is "Kinesthetic."

Visual Learning style: Individual prefers to organize information through images, pictures, and maps. They have merely visualized objects, structure, and plan in their mind's eye. Visual learner quality is to find their way around using maps. They have a good sense of directions.

Auditory learning style: Auditory learning style talks about the aural capabilities of the learner. They generally talk about the advantages and disadvantages of a situation and what to do in such a case. In them, emotions mean tone, pitch, and volume of their speeches. They have a habit of lengthy and repetitive descriptions. They generally forgot faces but remembers names and easily diverted by sounds. They capture oral instructions from a teacher and prefer to hear or narrate the information.

Kinesthetic Learning Style: Kinesthetic learner tries to learn things by manipulating objects, touch, and feel. Their body strain is a good signal of their emotional capability. They quickly lose interest in long speech, they are poor listeners. They desire to direct connection in what they are learning and easily distracted to pay attention to auditory and visual presentation. They are infrequently an enthusiastic reader; they may often jiggle while handling a book. They are poor spellers.

3.2 LEARNING MODEL

Learning model categorized as Course, Chapters, and Contents.

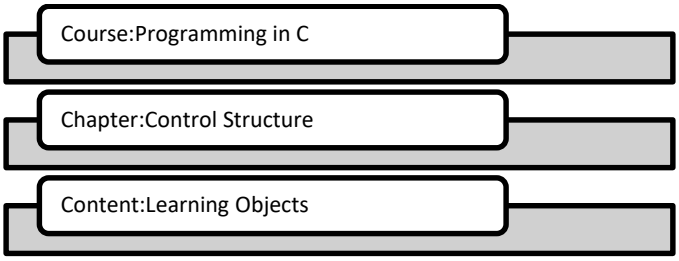

Fig. 1. Structure of the learning model

In the generation of learning style module learners get to know about preferences, so the learner can able to view the content as per their interest. For viewing the content suggestions has to be provided to the learner, ultimately learner can learn as per their capabilities. Presenting the content as per the user likings means a reduction in time to acquire the concept, our work proposes different learning objects to view the material such as

1. Text
2. Video
3. Animation
4. Exercise
5. Simulation
6. Real-life applications
7. Forum
8. Self-assessment test
9. Test

Visual learning style students can view animation, video, simulation to learn that content. Whereas auditoria learner used text, real-life applications, forums and kinesthetic will practice exercise, simulation, and Self-assessment test. Learning material is provided to students in the form of text, audio, video as per the learning style of the students.

IV. RESULTS AND DISCUSSION

As per the proposed mythology we have surveyed Engineering students to generate learning style, a total of 111 students participated in the survey. We received different responses for sample questions. Here we have presented response received for question number 1.

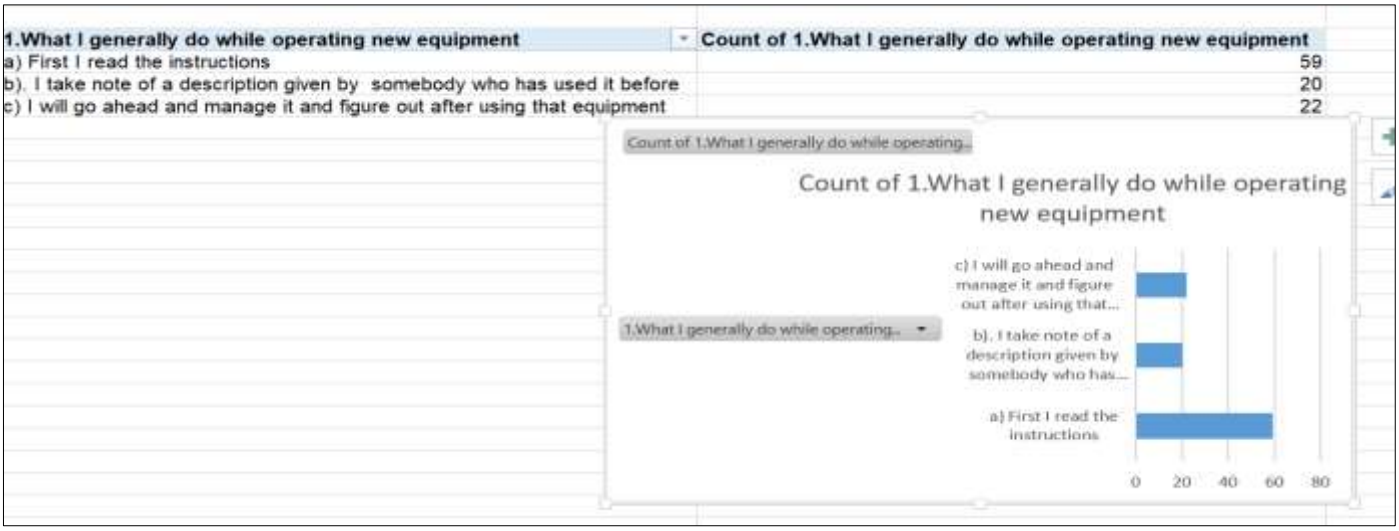

Fig 2.Response received for identifying learning style

Once we have received responses to questions next step is to capture the learning style of the individual student. Fig 3 represents response percentage of 'A' is 48 %, the response percentage for 'B' is 19%, and the response percentage of 'C' is 33 %. So generated learning style of the learner is visual.

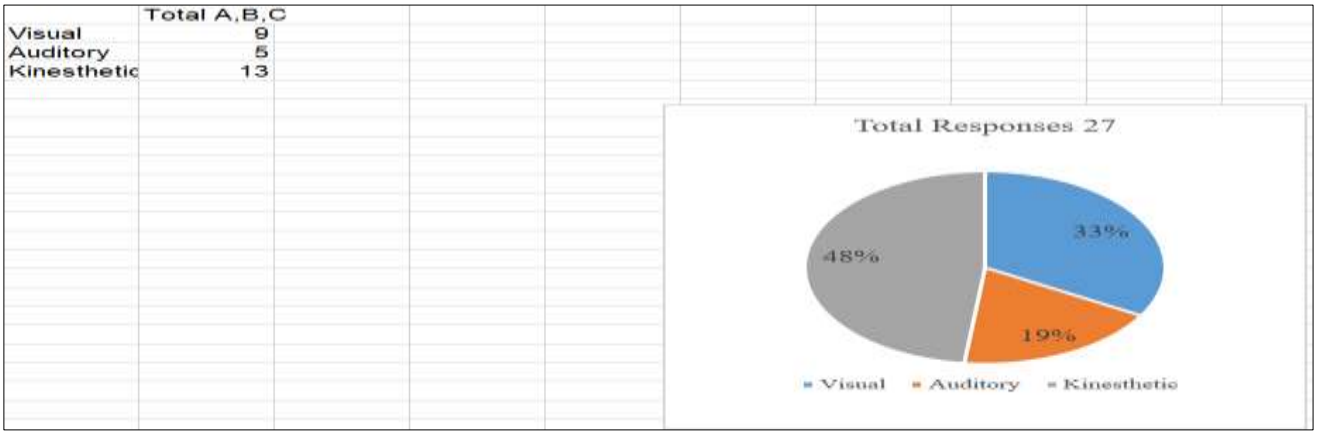

Fig 3.Individual student learning style

In general, as per the learning style of learner, it is better to use a multimedia tool for acquiring a specific concept. Table 2 shows Multimedia tools and representation of that tools.

Table 2: Multimedia tools and Learning Style

Multimedia Tools	Learner	Representation
Forum, wiki, Animation, Graph, Charts, Maps, Pictures, Simulation, Videos, E-books, Notes, Pictures	Visual Learner	Visualize objects, Presentations,
Audio recording, Podcast, Chat	Auditory Learner	Question and answer, problem-solving, Brainstorming, group discussions
Forum, Wiki, Weblog, Chat, email	Kinesthetic Learner	Experiments, Question, and answers, case study, problem-solving, Simulation, Games

Further, we have done learning style analysis of the entire class. For that, we have considered 100 appropriate responses of class as the whole. After calculating the total responses of participants, we received the result as shown in fig 4. It shows that the percentage of the visual learner in class is 33%, Percentage of the Auditory learner in a class is 28%, and the percentage of the Kinesthetic learner is 39%. So as per the analysis percentage of the Kinesthetic learner is more than others.

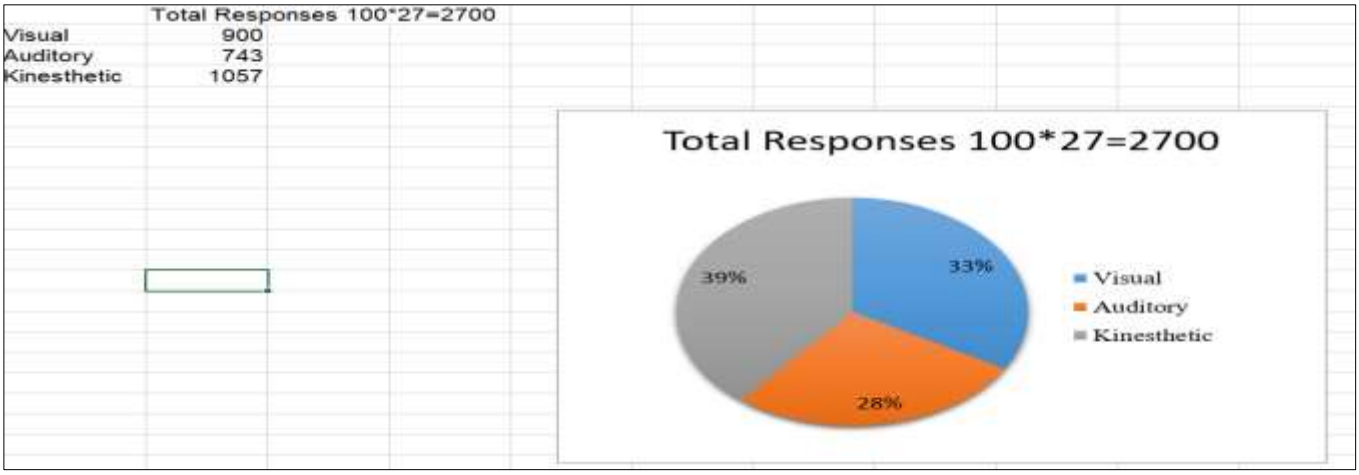

Fig 4.learning style of class

As per our recommendations, the teacher 's role is to apply different teaching strategy to educate the entire class. Suggested learning object for the whole of the class is to arrange physical activities such as conduct exercise, focus on practical's, shows simulation, problem-solving, question, and answersetc. It will be beneficial to students' for improvement in their performance.

CONCLUSION

For any e-Learning system, the minimum requirement is to computer literacy and knowledge of tools to handle at least the necessary minimum task. If students do not possess such skills, they failed to use such a system. Several subjects require physical practice such as public speaking, sports, so students opt for these subjects are not suitable for the e-Learning system. It is a replacement for traditional teaching and provides more technical information compared to conventional methods. ELearning is student-centric environment it provides flexibility to enhance knowledge by accessing Hugh material so for successful use of its students must be well organized, self-motivated and have excellent management skills. This work beneficial for improving students' knowledge in a particular field as well as teachers to improve their teaching style as per student's preferences.

REFERENCES

[1] Kwok Hung Lau, Tri-Lam, Booi HonKam, Mathews Nkhoma, Joan Richardson, Susan Thomas, " The role of textbook learning resources in e-learning: A taxonomic study, Computers & Education, Volume 118, March 2018, Pages 10-24, Elsevier

[2] Beulah Christalin LathaChristudas, E.Kirubakaran, P. Ranjit JebaThangaiah, "An evolutionary approach for personalization of content delivery in e-learning systems based on learner behavior forcing compatibility of learning materials," Telematics and Informatics, Volume 35, Issue 3, June 2018, Pages 520-533, Elsevier

[3] Aleksandra Klasnja-Milicevic, Mirjana Ivanovic, Boban Vesin, Zoran Budimac, "Enhancing e-learning systems with a personalized recommendation based on collaborative tagging techniques," Applied Intelligence, Volume 48, Issue 6, pp. 1519–1535, Springer

[4] Swati Shekapure, Vilas Thakare, "Problem-solving using case based reasoning," IJAICT, Issue 11, March 2015, pp 881-887.

[5] Swati Shekapure, Vilas Thakare, "Review on Intelligent and personalized E-learning System," IJCSIET--International Journal of Computer Science information and Engg. Technologies, Issue4, vol-3, 1 Nov 2014, pp1-7