Volume: 10 Issue: 02 Pages: 3829-3832 (2018) ISSN: 0975-0290

Blended Learning Model Supported by Recommender System and up-to-date Technologies

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ABSTRACT

This paper is describing how to add recommendation resources in Blended learning systems. The Blended learning system is a term increasingly used to describe the way e-learning is being combined with traditional classroom methods and independent study to create a new, which called hybrid teaching methodology. It represents a much greater change in basic technique than simply adding computers to classrooms; it represents, in many cases, a fundamental change in the way teachers and students approach the learning experience. This paper describes how an algorithm can be used to make recommendation of resources in the Blended Learning field.

Keywords –**Blended Learning, Recommender System, Recommendation Engine, Adaptive Learning System, Virtual learning Environment (VLE).**

Date of Submission: Aug 07, 2018 Date of Acceptance: Aug 28, 2018

I. INTRODUCTION

The Blended learning system is a term increasingly used to describe the way e-learning is being combined with traditional classroom methods and independent study to create a new. In some situations, the move to blended learning has inspired educators to redefine traditional roles.Trainers can shift their focus from the delivery of knowledge to its application, and companies spend fewer flying trainers around to oversee all instruction in person.By putting an emphasis on learning through supervised activities, blended learning has proven to be very adaptable to what some corporations are calling blended training [1].

A point of key components of blended learning is to identify what is already working well in a classroom, and what might be better suited as digital content or not. Instructors need to know that by adding digital content, it doesn't mean throwing out all the direct instruction in the classroom. Keep what is working well in a face-to-face mode and add what could be more effective in a digital format which can be downloaded or accessed.

Deliverables differed from person to another depending on the content area which is viewed. Some people overhauled an entire unit of their material, others focused on creating assessments for learning and putting those in place, while others took a more general approach and decided to transition all their handouts into a digital format so they were more accessible [3].

For somehow, it is important to getting started with some deliverables that are manageable and cooperative, and then keep adding new components over the year, or even next few years.

II. BLENDED LEARNING MODELS

This approach to learning combines face-to-face instruction with online learning and has yielded strong results since officially being researched as an education strategy.In addition to considering the age of the students, the reasons for choosing a blended model generally dictate which of the six models they choose to implement [4]:

1) Face-to-Face Driver Model

Of all the blended learning models, the most typical school structure model is face-to-face driver. With this approach, the introduction of online instruction is decided on a case-by-case basis, meaning only certain students in each class will participate in any form of blended learning. The face-to-face driver approach allows students who are struggling or working above their grade level to progress at their own pace using technology in the classroom.

2) Rotation Model

In this model of blended learning, students rotate between different stations on a fixed schedule – either working online or spending face-to-face time with the instructor. The rotational model is more widely used in elementary schools – 80 percent of elementary schools in California

Volume: 10 Issue: 02 Pages: 3829-3832 (2018) ISSN: 0975-0290

that use blended learning follow the rotational model – because many are already set up to have students rotate between stations.

3) Flex Model
The flex model of blended learning is often used in schools which are supporting many non-traditional or at-risk students. With this approach, material is primarily delivered online. Although teachers are in the room to provide on-site support as needed, learning is primarily self-guided, as students independently learn and practice new concepts in a digital environment.

4) Online Lab Model
The tighter resource constraints in schools nowadays leads schools to use the online lab model of blended learning which is a viable option for helping students complete their studies, including those not offered at the specific school site. In this scenario, students learn entirely online but travel to a dedicated computer lab to complete their coursework.

5) Self-Blend Model
The self-blend model of blended learning is popular in high schools in which it gives students the opportunity to take classes beyond what is already offered at their school. While these individuals will attend a traditional school environment, they also opt to supplement their learning through online courses offered remotely.

Benefits of Blended Learning
Blended learning offers flexible time frames that can be personalized to each person, offering them the ability to learn at their own pace. And it breaks down the traditional walls of teaching, ones that don't work for all students and now with access to present day technologies and resources we can tailor the learning experience for each student [2].

Advantages of Blended Learning for Teachers
- Teaching is less expensive to deliver, more affordable and saves time.
- Access to global resources and materials that meet the students' level of knowledge and interest.
- Self-pacing for slow or quick learners reduces stress, increases satisfaction and information retention.
- Students have the ability to track their progress.
- Students can also learn through a variety of activities that apply to many different learning styles.

Advantages of Blended Learning for Students
- Increase student interest: when technology is integrated into teaching courses, learners are more likely to be interested in, focused on, and excited about the subjects they are studying.
- Keep students focused for longer: The use of computers to look up information & data is a tremendous lifesaver, combined with access to resources such as the internet to conduct research.
- Provides student autonomy: The use of eLearning materials increases a student's ability to set appropriate learning goals and take charge of his or her own learning, which develops an ability that will be translatable across all subjects.
- Promote student ownership: Blended learning provide a sense of 'student ownership over learning' which can be a powerful force propelling the learning, it's this feeling of responsibility that helps the feeling of ownership.
- Allow instant diagnostic information and student feedback: The ability to rapidly analyses, review and give feedback to a student work, gives the teacher the ability to tailor his teaching methods and feedback for each student, while improving time efficiency.

III. METHODOLOGY

In this paper a recommendation will done on blended learning model that provides a recommended resource for the learner in which it based on matching between learner and the recommended resources.

1- Modeling phase:
In this phase the matching algorithm will be suitable one to retrieve the recommended resources during the blended learning studies. The matching algorithm depends on get the similar components over the resources list that gathered from the blended learning database. As it is containing a lot of different courses or study materials [7].

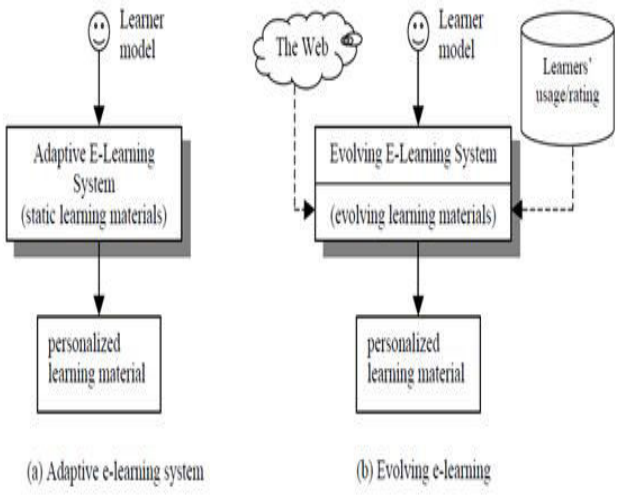

Figure 1: Modeling phase [11]

Group Modeling: Once learners' models are delimited properly, we apply a two-level model based collaborative filtering approach in order to organize the obtained models into groups of learners based on similarities and dissimilarities among their preferences.
Content Modeling: Generally, content modeling involves applying indexing and text mining techniques (which are

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part of Web content mining). The originalities of our approach are twofold [7]:

- The use of the open source search engine Nutch (http://lucene.apache.org/nutch) in the content modeling phase, followed by content-based filtering as a recommendation strategy.
- The automated indexing of standard defined educational content thanks to the search engine's powerful capabilities in the automated and scaled crawling and indexing phases.

2- Recommendation phase:

The recommendation procedure is performed using the following tasks [9]:

- Preliminary mining of learners' models based on Web usage mining techniques. First, we will gather web learners" sessions and we will apply a clustering approach to directly cluster these sessions. Each cluster contains similar sessions, showing similar interests of different learners. Each cluster can also be viewed as one learner's model.
- Preliminary mining of association rules (e.g. "Resource A, Resource B") from clustered sessions.
- Preliminary crawling and indexing of learning resources: this step consists of crawling the entire learning resources available in a course repository and forming an inverted index mapping each keyword to a set of pages in which it is contained.
- Extracting user preferences from the learner's registration process (set of objects or list of terms extracted from these objects);

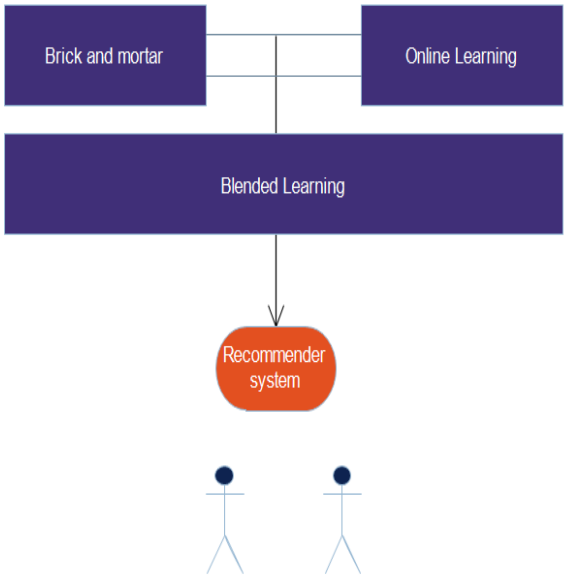

Figure2: Paradigm for resources recommendation

The Recommendation process based on two ways of recommendation:

1- Recommending using the course creator additions in table (recommends): The recommendation here is free added by the course creator of any type (papers, PDFs, URLs … etc.), recommendation appear to the user when he /r view the course as a list.
2- Recommending according to saved prefers list in table (prefer_recommeds).

The algorithm for second type recommendation is [9]:

Matching the member prefers which he /r select from database table named (prefer_recommends) when he /r register at first time which stored in the database table named (member_prefer) with the course prefers that selected from database table named (prefer_recommends) by the course creator previously when he /r create a course and recommend the course according to user prefer and display to the user.

Let suppose listof courses as an array named CorAry and a member preference as array called MemAry. The idea is to match the field named fixrecid in table member_prefer with table course_prefer and get the results. If they are equal, then we recommend the course to the member.

The algorithm function will be:

```
function getMatch($MemAry, $CorAry){
        $Result = array();
        for($i=0;$i<count($MemAry);$i++){
                for($j=0;$j<count($CorAry);$j++){
                        if($MemAry['fixrecid'][$i]==$
                CorAry['fixrecid'][$j]){
                                array_push($Result,$
                        CorAry['corid'][$j];
                        }
                }
        }
        return $Result;
}
```

IV. CONCLUSION

The recommendation done during the learning process is useful for all learners who use the blended learning. Because it provides an easy way to know what will be studied and why in which provide a full view for the target from study a course track.

The recommendation process depending on the learner preferences will help him in deciding what track he will learn.

All learners no matter their age learn differently, and teaching methods should reflect this, by designing teaching programs in a way that reaches visual, auditory and kinetic learners alike.

With the heavy integration of technologies, we'll be able to improve teaching, information retention, engagement, responsibility and enjoyment. Learners never outgrow their learning styles, meaning blended learning is more

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important than ever, no matter what the industry is, from schools to corporations, in all walks of life.

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