

# A New Approach in Learning Management System

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*Abstract*— In the digitalization era, a traditional classroom-based approach becomes less efficient and effective. To remedy the situation educational and training organizations adopt systems allowing instructors to explore various pedagogical models to deliver learning through engage and connect learners. Almost every year, 44 percent of education institutes and organization are trying to replace their existing system used to deliver efficient learning methods to improve cognitive skills for learners. Most educational institutes and training organization are looking for more than one system to cater their needs which changes with time. Managing multiple systems to satisfy their needs becomes a tedious task. Moreover, this rapidly changing educational field often prohibits adequate time for end-users to gain, a working knowledge on the specific system. Most of the time, these system are not flexible and often forces instructors and learners to adapt their teaching methodologies to fit the static design of the system, rather than the other way around. Therefore in this paper, a system is developed which will increase the engagement and students' collaboration. This system is based on a student- centred model, with a primary focus on students' needs and equal opportunities for everyone, independently of a background or abilities. The system can be easily integrated with the existing system without affecting the functionalities of the existing system. The implementation of the system in educational institution and training organization offers both learners and instructors unprecedented access to contents and related resources.

**Key words:** e-Learning, Education Curriculum, Learning

## I. INTRODUCTION

Extensive research on the acceptance of e-Learning in higher learning institutions identified several factors that challenge its implementation. A crucial benefit of learning is that it will facilitate doing business in the developing world. There already exist numerous systems for e-Learning and coursework from top-quality institutions which are accessed from all over the world. There is a boom in the online e-Learning platform in India in the recent years. According to a survey, the online e-Learning market generated \$3bn in revenue in 2016, and was expected to reach \$20 bn by 2019. It also addresses the relative lack of flexibility in the higher education system. In order to cater the needs of the learners and instructors, multiple system are being adopted by the organization and institutions. Hence managing multiple systems becomes a tedious task. Learning has always been an option for today generation. Multiple new ways to provide learning has been implemented.

## II. COLLEGIATE PLANNING AND TRACKING SYSTEM

### A. Overview

As a result of rapid development of the information and communication technologies and their increasing relevance in all aspects of our living, the role of learning system

increases too. Recent advancements in technology have provided better learning opportunities for the learners and instructors, changing the way of engagement with each other. Collegiate Planning and Tracking System (CPTS) is an integrated multi-user administrative, authoring and delivery platform that allows team head to manage, track and assess activities. The system includes learners and instructors to collaborate learning methodologies within an infrastructure. CPTS is designed within an educational system or training organizations to provide personalized and effective learning management system.

CPTS consists of attendance management, assessment management, events and activities management, feedback management system, customized user and role management and resource management system. Additionally the system allows the instructors to export excel data into the system and Asynchronous communication to enable effective engagement among learners.

### B. E-Learning

e- learning has been one of the major growing sector in the market. Considering it as a concept, eLearning is an learning platform utilizing the technologies to access educational curriculum outside the traditional classroom. The learning options has been widely diversified, learners can take part either online and offline. Learners can participate in the online curriculum or the traditional based curriculum. It is up to their choice to choose.

The technology has developed, and smart phones and tablets are now widely embraced in both the classroom and office. The use of a wealth of interactive designs that ensure distance learning is both an engaging and valuable lesson delivery medium.

The learning options of learners diversified very much, so they can take now course online as part of a formal curriculum or to fulfill certification requirements, exchange e- mails with a mentor on a regular basis, collaborate with other learners through e-mail. e- Learning enables and keeps records for all these activities. The system can represent a catalogue of both online and classroom learning opportunities to the learners, launch e-learning courses, allow participants to sign up for these opportunities when convenient, allow administrators to schedule the courses and assign instructors and provide the equipment to keep track of course attendance ad results, maintain a database of courses taken and results for each individual in the organization.

## III. SYSTEM DESIGN

System design is the process of defining, developing, designing elements and components of the system. It includes modules, architecture, components and their interface and data for the system based on the user requirements. A system is designed to support the business

requirements of an organization. It refers to a systematic approach to create a system from scratch or to enhance from the existing system.

Moreover Systems design always overlaps with systems analysis, systems engineering and systems architecture. Designing refers to the representation of the model of the system in an easier way to provide access to all. Without a strong design, building a system is tedious. It is the foundation of a system. From the developer point of view, system design includes four activities such as architectural design, data structure design, interface design and procedural design.

### A. Architecture

Architecture refers to a model in which the system is based upon. It is used to understand, clarify, communicate ideas about the system structure and the user requirements that the system must support. This paper deals with the MVC pattern (see fig 1) Now MVC has grown into a stage where it has become a framework rather than being a system design. The requirement analysis is the mandatory phase of software development. It is the first stage in the software development process. The importance of requirement engineering is to develop effective software without errors.

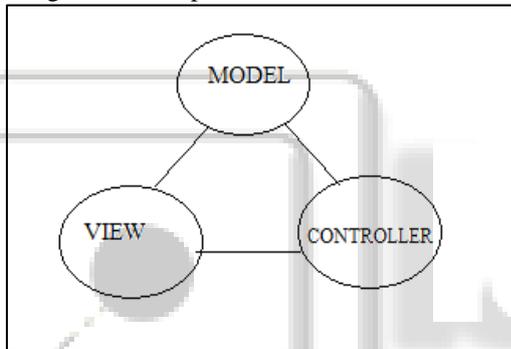


Fig. 1: MVC pattern

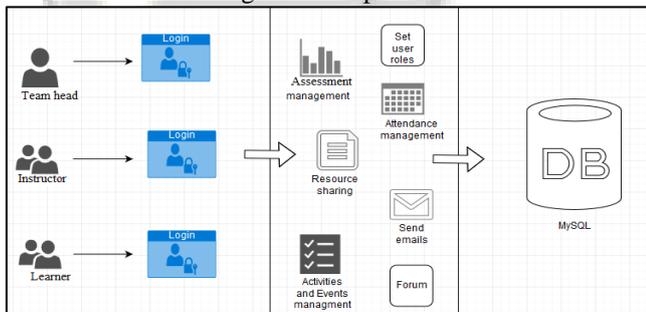


Fig. 2: Architecture Diagram of CPTS

The above is the architecture diagram of CPTS.

### B. Grails Framework

Grails framework is an open source used to develop web application. It is developed using Groovy programming language. It uses “coding by convention” method which allows developing standalone application without the usage of XML. Grails was previously known as “Groovy on Rails”. Later termed as Grails. It provides a development environment and hides the configuration from the developer. Grails provides web framework for Java platform. It reuses existing java technologies such as Hibernate and spring. It is a ready to use environment. The functionality is available through mixins some of the features using grails are as follows:

- Grails consists of convention-over-configuration, APIs, and the Groovy which makes it easier for developers to learn grails.
- It is built on top of Spring Boot and as features such as Spring-powered dependency injection.
- The framework integrates and interoperates with Java and existing java EE containers.
- It uses Apache Groovy which is designed to increase the productivity of the developer.
- Grails integrates with GORM, a data access toolkit consisting of the APIs. It is used for accessing relational and non-relational data and includes implementations for Hibernate (SQL), MongoDB, Cassandra, and Neo4j.
- It allows developers to build REST APIs and standalone web application with JavaScript.
- It uses domain specific language(DSLs) for validation, querying, mark-up rendering etc.

Grails allows scaffolding feature to generate CRUD operations for a domain. The simplest way to express the scaffolding feature is to include the dependency in the build gradle.

```

dependencies {
    // ... Compile"org.grails.plugins:scaffolding"
    // ...
}
  
```

Usually the controller handles requests and creates the response. A controller can generate the views with the command `grails – generate all.com.company.domain`.

### C. Spring Security Core

Spring Security, is flexible and powerful authentication framework to secure web applications. It is used to access control and provides security services for enterprise and software application. It has its own set of authentication. There are three areas focused by spring security - authorizing web requests, authorizing methods which can be invoked, and authorizing access to individual domain object instances. Spring security was previously named as “ The Acegi Security System for Spring” in the late 2003.

### D. UI Design

Groovy server pages is a view technology in the MVC pattern of grails. It is similar to technologies such as ASP and JSP, but more flexible. It is also a grails plug-in which is defined as the dependency in the build.gradle.

```

dependencies {
    ...
    compile "org.grails.plugins:gsp:3.3.1"
}
  
```

GSP is combination of markup tags and GSP tags. It is also possible to embed Groovy into the GSP. GSP typically contains no code.

### E. Bootstrap Framework

Bootstrap is a front end framework for HTML, CSS and JavaScript that is used for developing responsive websites. Bootstrap allows creating forms, navigation, modals, tables, buttons, and image carousels. It is an open source free framework with set of tools useful in creating layouts and interface components such as Scrollspy and Typeheads without writing a code for JavaScript. It is easy to integrate with the Grails application. It is available as a plugin.

```
dependencies {
    ...
    compile "org.grails.plugins:bootstrap:3.3.4"
}
```

Bootstrap has its own advantages. Some are provided below.

- Time efficient
- Responsive features
- Consistent design
- Ease to use
- Compatibility with all the browser
- Open Source and free to download

**F. Testing**

One of the key part of grails is testing. Grails provide automated testing and provides easier way of testing from low level unit testing to high level functional tests. The command create-\* and generate-\* will create unit or integration tests automatically. In order to run test, the following command is used.  
grails test-app

**IV. EXISTING SYSTEM**

Globalization has a great impact on transforming the knowledge. The knowledge sharing wasn't easy and hence technology came into action. Internet connected people of all walks of life. It became a medium for transferring data from one place to another. e-Learning became a platform to develop learning management system.

e-Learning market was estimated \$4 billion in 2016 and expected over \$9 billion in 2019. The existing system consists of multiple system like learning management system, leaning content management system and content management system.

Learning management system consists of features such as certification issue and tracking, courseware information system, course tracking and assessment.

Learning content management system consists of resources and content maintenance and handling. Both the system have similar features which are available to the user without a customization. Instructors and learners have to adapt to the system. It takes ample amount of time upgrading to the functionality of the system.

Most of the educational institutes and organization prefer customized system rather than a predefined one.

Year	Technology impact in e-Learning		
	Overall Percentage of growth in e-Learning	Through Mobile Learning	Through Web Learning
2012	10.8 %	2.0%	8.8%
2014	50%	12%	38%
2018	80*	52%	28%
2020	92%	60%	32%

Table 1: Overall growth of e-Learning

The above (see Table I) lists the technology impact on the e-Learning platform. The growth in the technologies provides a greater impact in learning methodologies.

**V. PROPOSED SYSTEM**

The web is too vast and diverse. Electronic learning is much preferable. The market is fast growing with innovative

products. CPTS allows managing personalized learning experiences.

Unlike other e-learning, CPTS allows the functionalities within a single system. It meets the needs of all the learners and instructors within a system. It focuses on a group or community of people and hence enables efficient communication.

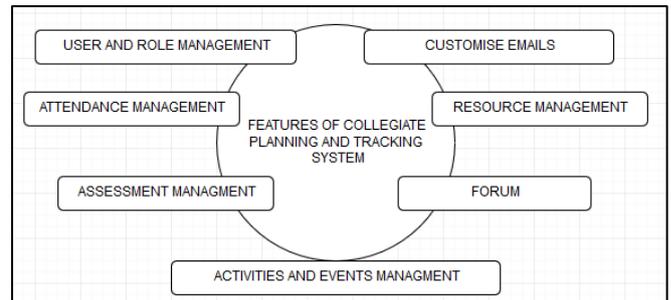


Fig. 3: features of collegiate planning and tracking system

**A. Functionalties of proposed system.**

Some of the features of proposed system are the enhancement of the existing. It includes the following, with an easy to integrate feature with a existing system.

- Authentication&Security
- Blended/HybridLearning
- Classroom Management
- Collaboration Management
- Competency Management
- Content Management
- Document Management
- Learning Management
- Event Management
- Notifications – Email
- Performance Assessment
- Registration Management
- Resource Management
- Self-Registration
- Student Tracking
- Training Tracks
- User Access Controls

**VI. CONCLUSION**

Driven by the mobiles, e-Learning plays a vital role in education. CPTS is a system in e-Learning platform. This paper provided the development process of the CPTS system. Moreover satisfying learner and instructors within a infrastructure might seems to be possible but when it lies outside the infrastructure, it becomes tedious.

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