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Futuristic Design & Development of Learning Management System including Psychological Factors Resolution

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Abstract

Using information technology to educate pupils has become more common. Now in this technological era a specific software or app is used for this which is called learning management system, which sort out all the issues arises in teaching of students, whether it is classroom activity, student database, students transport tracking and many more activities. Frequently, all of these platforms have comparable characteristics, and consumers are unable to choose the one that best matches their needs. The purpose of this paper is to examine the usability and functioning of software in LMS frameworks. For this we can create and maintain login accounts, their time of using the account and can also distribute these sessions between the users centred on the combination of analogous work on the common database. It is not necessary to enter the data manually and through two separate systems. This characteristic increases the speed and precision of the learning management system in use, increasing its value. By initially cutting down on the time it takes to create learning resources inside the LMS. Second, the precision with which the LMS's learning materials are created. Third, the accuracy with which students and instructors are assigned to the particular course of whole year. Last but not the least; classroom can be created by using the LMS that is 100 percent compatible with the CMS. In this class we can includes not only students, users, and Subjects also teachers their departments, different faculties can included. From a design and development standpoint, this paper contributes a highly up-to-date way of software techniques for net-based learning management systems.

Keyword:- learning management system, software, CMS, database, classroom teaching.

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I. INTRODUCTION

A. Education via electronic-Learning (e-learn)

Learning or education is the procedure of assimilating information, ideas, beliefs, knowledge, and skills by a person. There are two types of learning activities: formal and informal.

Formal learning is like conventional learning which needs specific organised and systematized background whether it will a school, any institution or work area and also need properly well identified time, schedule, objective, resources and places. Formal learning is a deliberate conventional learning which finally provides certification.

Informal learning is actually needed to the persons whose study was hampered due to their day to day activities, like job, family reasons, sometime it is leisure. It is not systematized as formal learning also its objectives, time slots, and teaching assistance are also non-structured.

Apart from these two education systems now a days a new learning technique is in quite fashion which is called e-learning or electronic learning. Electronic learning is basically delivered or communicated through the internet connection by using computer, mobile. Electronic multimedia such as music, text, photos, video, and other forms of e-learning are example of e-learning. Each creates a stimulating and pleasurable learning environment for the learner. Furthermore, e-learning is not restricted to the classroom. For everyone participating, this encourages a higher level of distant learning. It's a fantastic choice for folks who can't manage to be present in lectures daily or who leave far from the institute, college due to their time or circumstances. It is a self-paced, asynchronous learning process [2]. In the words of Horton, e-learning is the learning "whenever and wherever people want", According to Clark e-learning is the learning which uses digital media to spread education. Digital media consists of text, graphics, graphs, symbols and stored in various format in digital devices internal or external storage, also external hardware storage can be used like CD, Flash Drive, Pen Drive and virtual storage like Google drive, cloud can also be used[4].

E-learning activities may be categorized into the following categories based on their time dependence:

1) Synchronous: Synchronous learning needs that learner and tutor both should be present at the same time at internet connection with same software application through which they can communicate with each other.

2) Asynchronous: Asynchronous learning has no such type of dependency that a student and tutor should be present on same time on same application, because in this learning both the tutor and learner don't interact with each other. The students just learn by the audio-visual files which are uploaded by the tutor on different communication media time to time. This learning is not time critical. [4]. Asynchronous teaching techniques are the most prevalent in education, and many educational institutions employ a variety of education arrangements, comprising learning management systems and other sources of online erudition like video conferencing using Google meet, Skype, study base app, and by using other numerous audio and video tools.

B. E-Learning Platform

Basically e-learning platforms comprises different software programs or applications which have multiple in-built modules for student teacher communication, student's performance assessment, their regular monitoring, and for their activity management, which are so strategically, and structurally managed that every one finds these tools very handy. The main objective behind these platforms is to provide technology assistance to instructors and students in order to maximize all stages of the teaching-learning process, whether it is a wholly remote classroom or a mixed environment. It also incorporates both modalities in varying quantities [5], [6].

We may categorize e-learning platforms based on their features and purposes, as follows:

1) LMS:-

A learning management system (LMS) is an arrangement that provides different learning management tools and accomplishes the scholastic procedure over the Internet or by using an internal local area network. It establishes a link between learning material and learners. It keeps track of users, instructional resources, and learning opportunities. It keeps track of learning progress and administers administrative activities [7] [8]. Students are connected to one other and their teachers via the LMS, which connects them to the classroom and its activities online, they use the internet to share study materials, archive resources, and even electronic textbooks. They're

fusing educational activities with administrative systems. By using LMS Teachers can also enhance their knowledge and teaching skills. These tools may be used by students to improve their engagement with instructors. By using such technologies in a variety of educational settings [9] [10].
Nowadays, a learning management system (LMS) is also known as performance portal. There are plenty of open source LMS available at free of cost on internet. Many of them have quite capable features. Moodle, E-front, Atutor, Dokeos, and Docebo are examples of open source LMS systems. Moodle is a well-known LMS.

2) CMS

CMS stands for content management system, and it includes the most basic features. CMS stands for content management system, and it is used to create papers, lectures, and other information. CMS systems may also include tools that enable users to publish, edit, alter, and maintain content by merging rules and procedures via a single interface. CMS is a content repository that stores textual material, documents, videos, photos, mobile numbers, and other scientific records. Within the system, it is required to develop content. Forums, email, and chat are examples of communication tools [15].
CMS stands for content management system, and it is a set of software tools that allows students to connect with one other in an online setting. This allows the teacher or student to design an online course without knowing HTML or any other computer languages [15].
A content management system (CMS) consists of a set of online tools and an environment for example if we talk about course management system then it have a registration system where student can register himself, another tools are academic information system and student information system which provide complete detail of a particular student as shown in Fig. 1.

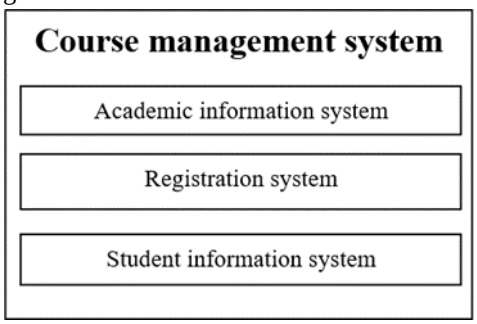

Fig 1. Modules of a course management system.

CMS or a content management system is basically provides the management or organization of all contents related to any work module. It is widely used in educational institutes to maintain the log of registration of students, faculty or staff, materials, equipment's, also maintain schedule, stock, repository, time , activity log for different department. And play a very important role in university and institute work management whether it be academic, administration, teaching, learning activity or any operational activity. This software tool environment interacts with several educational establishments [16]. Now CMS have become an essential and integral element of the higher education environment, and playing an increasingly important role in the instruction and education method [17]. As content management has many capabilities which it offers for learning, for course registration, and for learner-instructor interaction in the classroom, that's why it is chosen vary widely by the educational organizations. If LMS and CMS used integrated then it will be more useful.
It plays a key role in social contact and resource sharing, along with the exchange of concepts and views via presentations and conversations, comments and blogs, among other things. CMS provides numerous characteristics that need be included in future e-learning systems:
1) Merging of official and informal education, as well as the trend toward collaborative learning.
2) Improve the kids' self-control.
3) LMS can be connected to the distinguished learning object depository. This will establish a form of splendid database, and then LMS will act as a distribution depository, allowing you to explore the entire capacity of net for instructional content transmission across e-learning schemes.
4) It is object based learning which uses feature of reusability to transfer knowledge from one system to other.

5) It provides the ability to create pooled archives, media with repository so that one can study from several LMS contexts.
6) Installing external functionalities that aren't created by the LMS's owner's firm.
7) It also provides ERP and LMS integration. ERP (enterprise resource planning) is a system that facilitates service integration via a single object resource planning. CRM is a tool for managing customer relationships.
8) Improve the LMS's interaction with media material, as well as the balance between control and flexibility for LMS customers, allowing them to participate in the quality of learning, activities, and assistance [18]. Ads, chat, debate, email, and wikis are some of the tools you may use. However, the educational institution's administration imposed limits on student connection and collaboration.

3) LCMS

As name depicts LCMS is the combination of CMS and LMS into a single environment with the main objective of provide and distribution of course material. The LCMS makes it easier to organize information created using authoring tools and offer it to students through the LMS [21], [22], [23]. LCMS is also known as VLE i.e. virtual learning environment.

RESEARCH METHODOLOGY

A. Requirement Analysis

To start project first we should identify the requirements or needs of the **stakeholders** and also we have to identify that to fulfil these changes what we exactly need in our **application domain**, what kind of sources, tools, programming language, logical and technical details we will need in implementation, as shown in fig 1. Also we clearly check out or demonstrate the flaws in the present system of conventional education and e-learning, so that these can be tried to resolve. In business context, e-learning systems have lack of use of the benefits of social needs, this can be used as an important tool by publicizing it in between people.

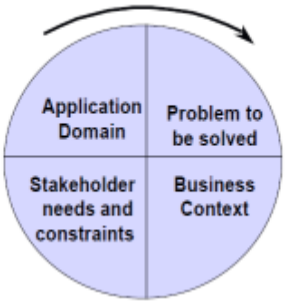

Figure 2: Requirement Analysis

B. Interviewing Stakeholders to Analyse Them

We performed a stakeholder interview to learn about the social needs for an e-learning system. The results of the interview suggest that stakeholder’s need a list of criteria to enable them operates more efficiently on the e-learning system. There are three sorts of social needs that stakeholders have requested:
The problem of virtual classrooms' electronic processing: to resolve this proper training for the teachers and students is needed.
Eliminate manual and paper-based business processes:- to resolve this all the activities should process electronically in virtual classrooms which should be equivalent to conventional classroom education.
During the e-learning system's processing, these activities require time and effort:- when we start to use the system then first time it need to feed all the database after that it becomes more easy as it has reuse facility which is absent in conventional teaching methodology.

C. The Social Interaction Problem solutions and Design analysis

During the interview, stakeholders arises that they need that student teacher interaction should not limited to classroom only, alike conventional methods. So to resolve this we add the suitable social media interaction

platform, through which student can communicate with teachers at any time and this interaction should also be private. Also stakeholders need a same registration and admission process they follow in traditional method. For this we create modules for different classes and departments with criteria. Stakeholders arises the need to create virtual classroom same as physical classroom, to solve this we divide data uses accounts in three categories: - student, teachers, administration, and grant them different level of access of the e-learning system. For data entry of student, department, course we uses excel file with .csv extension. Also we decide to include course management system , so that users whether student, teacher of others can easily enter and update their syllabus, assignments, homework, test, exams, fees, activities and other information easily.

The interview that was performed assisted in defining the needs that we needed in order to design a new model. Through the use of requirements elicitations, which are a component of software engineering, and the usage of re-use requirements, you may contribute to the creation of systems. The goal of this project is to leverage current systems to construct a new system that benefits the stakeholders. Reduce the cost of materials as well. It's also focused on bringing user systems together. Unify passwords across e-learning and management system materials, for example. Users' courses were also tracked, as with their role retention. As a result, instructors and students are more likely to adopt an e-learning system. This is due to a less physical labour in the creation of virtual classrooms.

Here we propose an integrated approach of LMS and CMS according to the need of stakeholders or users, this proposed approach will design in two steps:-

Step First:- Research existing open source learning management systems and course management systems. Specify all the features of learning management system (LMS) and content management system(CMS) and then embed them for implementing new approach named learning integration course(LIC).

Step Second:-in this step we embed the resultant LIC in to the suitable and required social media platform and build a learning integrated course social (LICS), which is integration between Learning Course Management System (LCMS) and social media.

III. TECHNIQUE FOR IMPLEMENTATION

The social needs of e-learning are based on conventional education and social network systems. We proposed a paradigm for integrating conventional learning approach and social networking platforms which gives new improved learning management systems. This approach will make use of existing open source system components to create an integrated, collaborative, and interactive electronic education system.

We integrate e-learning components with conventional education system components via prototype model design. Then prototype model is combined with social networking components in the second stage of this concept, as illustrated in Fig. 3.

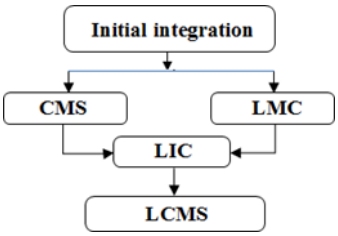

Fig. 3 Integration of CMS and LMS

A. LMS (Learning Management Systems)

Table 1 shows the features of LMS approach which are used and available in our proposed approach too, as we are combining LMS with the CMS at primarily stage. Each feature has a collection of tools that correspond to the nature of the task. As a result, the primary traits shown in Table 1 will be utilized to generate categorization of features.

A categorization of learning management system is shown in Table 2. Learning management systems are classified into three categories: administration, communication, and learning. Each categorization has its own set of characteristics depending on the nature of the task. So, as indicated in Table 2, the first classification

(administrator) will be used to integrate LMS with conventional or content Management systems (CMS) and to construct an administrator categorization framework (as shown in table 3) it is necessary that it will have all the features of LMS and CMS which are shared by both.

Table 1: Important Features and tools of LMS

Features LMS		
No.	**Features**	**Tools Used In Features**
1	Users	Accounts, Permissions
2	Courses	Add/edit courses, Course default settings, Course request
3	Grades	General settings, Grade category settings, Grade item settings, Scales, Letters
4	Location	Location settings, Update time zones
5	Language	Language settings, Language customization, Language packs
6	Plug-in	Activity modules Assignment, Book, Database, Folder, Forum, Glossary, IMS content package, Lesson, Light box Gallery, LTI, Page, Quiz, File, SCORM package, URL, Workshop
7	Security	IP blocker, Site policies, HTTP security, Notifications, Anti-Virus
8	Appearance	Themes, Calendar, Blog, Navigation, HTML settings, Media embedding, Docs, Default My page, Default profile page, Courses, AJAX and JavaScript, Manage tags, Additional HTML
9	Front page	Front page settings, Front page roles, Front page filters, Front page backup, Front page restore, Front page questions
10	Server	System paths, Support contact, Session handling, Statistics, HTTP, Maintenance mode, Cleanup, Environment, PHP info, Performance, Hubs, Update notifications
11	Reports	Comments, Backups, Config changes, Course overview JMeter load testing, Logs, Live logs, Question instances Security overview, Statistics, Spam cleaner
12	Development	Debugging, PHPUnit tests, XMLDB editor

TABLE 2: Categorization of Characteristics /Features of LMS

Categorization of Features		
No.	**Categorization**	**Features**
1.	Administrator	Users, Courses, Grades, Location, Language, Plugins, Security, Appearance, Front page, Server, Reports, Development
2.	Communication	Forum, Workshop, Massages, Wikimedia, Chat, Emails, Survey, Flickr, YouTube, Dropbox, Bookmarks
3.	Learning (Active, Resource)	Assignment, Book, Database, Folder, Glossary, IMS content package, Lesson, Light box Gallery, LTI, Page, Quiz, File, SCORM package, URL, Workshop

The structure or framework of the e-learning management system, is shown in Table 3. Table shows the user of LMS, their authorization or permission granted, and users authorization details in the integrated LCMS system.

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TABLE 3: Structure of the LMS Administrator

Structure of Administrator				
No.	**Courses**		**Users**	
1.	Accounts	Add a new user	Add Course, Add group	Add/edit courses
2.	Permissions	Define roles: Manager Course creator, Administrator Teacher, Non-editing teacher, Student, Guest	Add sub categories	Add categories

In the integrated Learning system every user or content has its own role and authorization, this can be explained as follows:-

1) **Administrator:** Users in this category have full access to the system and may execute any function.

2**) Manager:** Managers have access to and can edit courses, but they seldom engage in them.

3) **Course designers** have the ability to create new courses.

4) **Teacher:** Within a course, teachers have complete control over the undertakings and grading/marking of students.

5) **Non-alter teacher:** Non- alter teachers are allowed to teach in classes and grade students, but they are not allowed to change undertakings.

6) **Student:** Within a classroom, students often have less rights.

7) **Courses:** In the LMS, courses are virtual spaces. Teachers can add learning materials for their students in this area. Administrators, course creators, and managers can all create courses.

8) **Accounts:** Create a user profile and personalize the information.

B. Management System for Courses

A course management system is a software program that is used in educational institutions to keep track of students, teachers, materials, faculties, departments, and work assignments. As shown in Fig. 4, the course management system's basic functions include registering classrooms, recording course material for students, teachers, and administering grades.

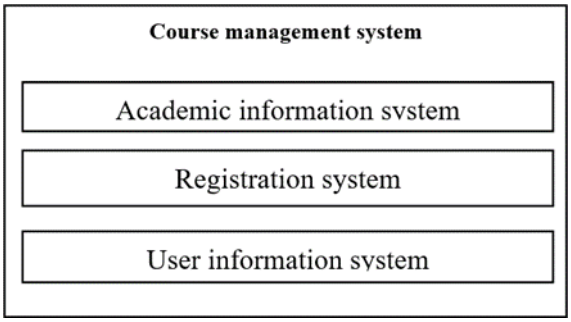

Fig 4. Structure of CMS

Structure of course management systems have following sections:

1. **Academic information systems:** This module or system process data from educational institutions' courses.

2.User information system (student, teacher): In an educational institution, a system stores personal data about students and teachers.

3.Registration system: This system stores information on student registration in topics and semesters. Registration data will be recorded for each semester's classes, as well as the data for each semester's instructor.

CMS is a research and development centre for the conventional educational system. CMS basically important because of the interactions that exist between the instructor and the students in the classroom. Table 4 depicts the infrastructure required to connect conventional education systems (CMS) to learning management systems. Table 5 depicts the course management system's primary features structure, which facilitates the integration process.

C. Advantages and Disadvantages of Using a Learning Management System and a Course Management System

A LMS system has many of the characteristics of a CMS (conventional educational system).

Table 3: Framework of the Course Management System

Framework CMS			
No.	Academic information system (AIS)	User information System (UIS)	Registrationsystem (RS)
1.	Course schedule	Data student personal	College
2.	Registrar student course	Data teacher personal	Department
3.	Registrar teachercourse		Course

Table 5: Primary features of CMS

Features in Course Management System			
No	Features in Course Management System	LMS	CMS
1	Academic information system	-	-
1.1	College	-	ok
1.2	Department	-	ok
1.3	Course	ok	ok
2	User information system	-	-
2.1	Data student personal	ok	ok
2.2	Data teacher personal	ok	ok
3	Registration system	-	-
3.1	Course schedule	-	ok
3.2	Registrar student course	ok	ok
3.3	Registrar teacher course	ok	ok

Table 6: Comparison of features used in LMS and CMS

No.	Features in learning Management System	LMS	CMS
1	**Users**		
1.1	Accounts	ok	ok
1.2	Permissions	ok	ok
2	**Courses**		
2.1	Add courses	ok	ok
2.2	Add categories	ok	ok
2.3	Add sub categories	ok	ok

Many of the functions of the learning management system are included in the course management system. The LMS is a tool for organizing and facilitating collaborative content development.
In the classroom, the CMS was utilized to organize and support collaborative work. The emphasis of a course management system is on data management in an integrated database, which is utilized to determine the kind of classroom. As shown in table 6 LMS have to be engaged in the administration of several of the course components.
Data management in an integrated database is the emphasis of a LMS, which is used to make learning accessible. The features utilized in the LMS are the same as those used in the course management system in terms of form and configuration.
The LMS and CMS may be customized to meet the demands of a particular educational institution. Understanding the distinctions, the main features of each, and the advantages of combining may assist decision makers in selecting the best LMS and CMS integration solution.

D. Learning Management System and Course Management System Integration

An LMS and a CMS may be integrated in a variety of ways. The strategies include incorporating conventional learning aspects into the LMS. The LMS and CMS integration approach was utilized among these methods. Users connected into the LMS were able to access the CMS without having to authenticate again via the CMS, due to the integrated system. Based on the conventional educational system's records LMS creates a virtual classroom for each instructor, as well as an academic calendar for each student and teacher so that both the student and the instructor can access virtual learning environment.
Integration of CMS and LMS can be done by collaboration and integration of best features of both systems. And this will create LIC. The benefit of this new LIC model is that it only exchanges information in one way, that is, information from the integrated system is only sent from CMS to LMS and not vice versa (LIC).

Algorithm (LIC):
Step 1: Get input of LMS and CMS.
Step 2: Implement the integrate algorithm (LIC).

1. For each user
    a. verify if user is available in database.
    b. If not add.
    c. Else update the status
2. For each Course
    a. verify if course is available in database.
    b. If not add.
    c. Else update the status
3. For each registerd_student_course database

a. verify if course is available in database.
b. Verify the student is available
c. If student is enrol in course then update database

Step 3: Repeat step 2 for each student, course and user.
Step 4: based on the findings of the investigations in step 3,update the features in the integrate algorithm (LIC).
After the integration and merge the LMS with CMS, the user (students, teachers) can share the material interactively away from the classroom so-called asynchronous education.
LCMS provides a system or environment which have have features of both the environment , so we can say that lms is a subset cms.

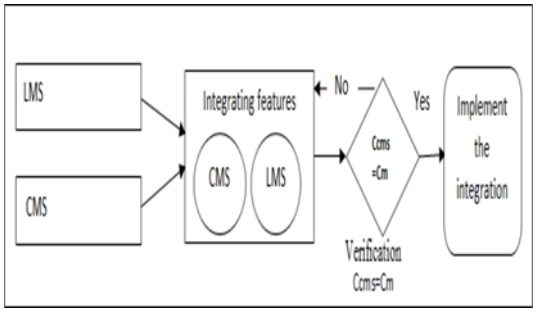

Fig 5. Algorithm Steps

Fig 5 depicts the algorithm that combines the LMS and CMS, as well as the stages for implementing the algorithm (LIC).

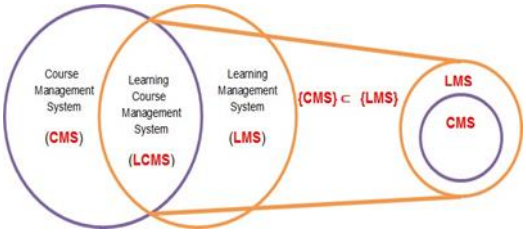

Fig 6. LMS is Subset of CMS

The integration should check three fundamental criteria so that we may avoid many of the challenges that might arise throughout the process of picking the features that would verify the proposed system requirements. These are scalability, versatility and integration of candidate system with existing system.

In E-learning model which is based on course management system and learning management system, we are combining the capabilities of learning management system and course management system in the suggested design. Learning course management systems have organized environments to assist firms in implementing improved procedures and practices by creating an endless number of e-learning courses [32-35]. The strength of a learning course management system is the integration with the learning management system.

Figure 7 depicts the framework for integrating the learning management system and the course management system, as well as the essential components involved in combining the two systems.

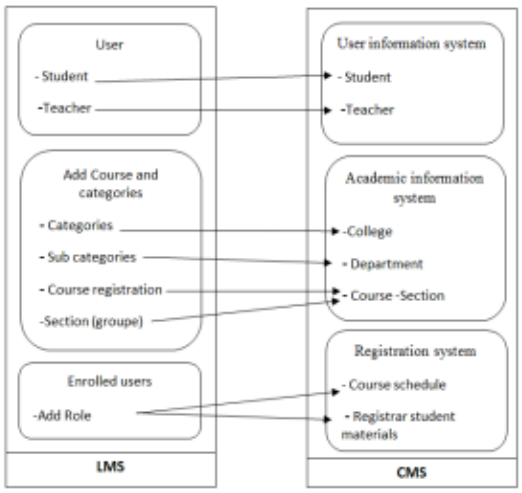

Fig. 7. Framework the algorithm (LIC).

IV. RESULT

In the new proposed method LCMS we can automatically synchronize and easily update & users, authorization, courses, students, teachers, staff data and can distribute course with the users with no hassle through computer and there I sno need to manually input and manage the data again and again once it is entered in the database.

This will increase the throughput of work, less manpower needs, accuracy and time management as shown in table 8. So we can conclude that:-

1) Decrease the time it takes to create educational materials in the LMS.
2) Increase the Accuracy in the creation of educational materials within the LMS.
3) It will give more accuracy in course distribution in between the students and teachers.
4) We can easily maintain schedule and time table of students and classrooms, course, departments, sections, students, colleges etc.

Table 8: Results in the Initial Integration

RESULT			
Tasks	Number of row in DB	Time run	
		Manual (CSV)	LIC
User data	6738	15 mints	2.0 second
College	15	7.30 mints	4.3 second
Department	83	41.3 mints	8.4 second
Course	808	215.4 mints/3.08H	48 second
Distribution User to course	38032	69.4mints /1.156H	30 mints

Table 8 shows the results when we enter data through the older conventional excel method and through new model LIC. And we can see that the LIC model is more efficient than the older method.

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