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An E-Learning Model on Web Based Technology with reference to Content Management System: A Functional Approach

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ABSTRACT

An organization has a website on internet or intranet. It has grown organically over time and while it is very useful, it is far from perfection. Much of the content is out-of-date or inaccurate, it's hard to find things, updating the site is complex, and the appearance is becoming outdated. What was on the site last week, or last year? One can't say. Thankfully, these problems are what a Distributed web content management system is specifically designed to solve.
There are a wide range of business benefits that can be obtained by implementing a CMS, including:

- Faster turnaround time for new pages and changes
- Greater consistency
- Improved site navigation
- Increased site flexibility
- Increased security
- Reduced duplication of information
- Greater capacity for growth
- Reduced site maintenance costs

Beyond these, the greatest benefit the Distributed Web CMS can provide is to support your business goals and strategies. For example, the Distributed Web CMS can help to improve sales, increase user satisfaction, or assist in communicating with the public. The open source community has produced a number of useful, high quality Web content management systems which presents an opportunity to deliver tailored content management solutions without the high licensing or management fees associated with commercially-licensed or hosted software

1. Introduction

Three factors such as explosion of unstructured data, the need to manage content in a better way and the internetworking and collaboration within and between the enterprises drive the need for distributed content management solutions. Distributed content management systems address the need to access content wherever it resides, produce content and maintain greater control over the produced content, and collaborate efficiently by sharing data in real-time within a distributed network of stakeholders.

Organizations can deploy the Distributed content management solutions to share real-time information across geographically dispersed knowledge workers. The Distributed content management solutions form the backbone of any platform that requires real-time, efficient information sharing, as it provides a virtual content repository without distracting from the strengths of other process-dependent systems.

Implementing web content management (WCM) is not only crucial to maintain the quality of information on the website; it can provide significant efficiency, productivity and cost reduction benefits.

Organizations of all types, commercial, government, educational, and non-profit entities, create a lot of content. Increasingly it is desirable to retain and manage this information as an information asset for possible reuse. Content can be anything from complex structured documents, to simpler messages, correspondence, business documents, transactions, emails, and the many other documents that workers create, share, transmit and archive. If an organization can manage their information assets in a meaningful way, that content can provide financial benefits and therefore, its value increases.

2. Objectives of the Study

The research study contains the following objectives: -

- To study the utilization of Web Content Management System on web application.
- To determine the e-learning model for various utilization in learning process.
- To analyse efficient and sustainable processes to assure high quality Distributed Web content management system

Benefits of Online Administration

This is all the more significant as your business comes to depend on your website as a communication channel. The WebBiz CMS handles all the technical details, permitting anyone you authorize to update and manage the site. That way, any of your employees can help to keep your website updated, instead of it being limited to just one person (you). The CMS will help you to know who is doing what, eliminating potential confusion and saving valuable time.

The purpose of CMS's Data Administration (DA) web site is to guide the reader through the creation, utilization, and maintenance of CMS's data resources. Stepwise procedures, guidelines and CMS data standards are provided to data analysts performing data modeling tasks for new software development projects that are crafting new CMS data and reusing existing CMS data.

Types of Web CMS

While there are many website content management systems available, they all fall under two main types: **Premade Content Management Systems** or **Custom Content Management Systems**.

The most popular type of website content management systems are premade or **open source CMS**. Some of the more well-known open source content management systems include: Drupal, Joomla! and WordPress. Just because premade CMS are the most commonly used does not make them the best type of CMS. Open source CMS are generally a lot cheaper than custom CMS for a few reasons: the code is typically free and the options available are limited.

Open source CMS are put together by many developers all over the world. That means that no one knows all of the code that makes the CMS function, making it harder to customize anything. Having been built by many developers also means that there is a lot of extra code to make the CMS function. Extra code on the front end of a website can hurt your website's search engine ranking. You want your website pages to have as little code as possible and **premade CMS** don't allow for that.

Custom content management systems are not used nearly as often as premade CMS, but they are the only CMS used by WebDuck Designs. **Custom CMS** are likely to cost more than premade CMS, but come with a lot of benefits like: being scalable, allowing for unlimited options and function using as little code as possible.

WebDuck Designs' **custom website admin panels** are built 100% in house, which means that we know every inch of the code. Unlike premade CMS you are not stuck within the restraints of the programming, we are able to add on nearly any functionality and as many different options as needed. Since all of the code for our custom admin panel is coded in house we are able to add and modify functionality with as little code as possible. Less code on each page of a website allows for a better code to content ratio, giving it a better chance of showing up high in the search engines.

What does a Content Management System (CMS) costs? What are the fees for CMS?

Prices for website content management systems vary based on a number of different factors including: the **type of CMS**, the functionality and options needed, and the experience of the website company building the CMS. Contact the experienced programmers at WebDuck Designs to get a quote for your website and website CMS.

Towards Understanding Web Applications in Totality

A web application is an application that is accessed over a network such as the Internet or an intranet. The term may also mean a computer software application that is coded in a browser-supported language (such as JavaScript, combined with a browser-rendered markup language like HTML) and reliant on a common web browser to render the application executable.

In the early days of the Web each individual web page was delivered to the client as a static document, but the sequence of pages could provide an interactive experience, as user input is returned through web form elements embedded in the page markup. In 1995 Netscape introduced a client-side scripting language called JavaScript allowing programmers to add some dynamic elements to the user interface that ran on the client side. So instead of sending data to the server in order to generate an entire web page, the embedded scripts of the downloaded page can perform various tasks such as input validation or showing/hiding parts of the page. In 1996, Macromedia introduced Flash, a vector animation player that could be added to browsers as a plug-in to embed animations on the web pages. It allowed the use of a scripting language to program interactions on the client side with no need to communicate with the server. In 1999, the "web application" concept was introduced in the Java language in the Servlet Specification version 2.2. [2.1]. At that time both JavaScript and XML had already been developed, but Ajax had still not yet been coined and the XML Http Request object had only been recently introduced on Internet Explorer 5 as an ActiveX object. In 2005, the term Ajax was coined, and applications like Gmail started to make their client sides more and more interactive. A web page script is able to contact the server for storing/retrieving data without downloading an entire web page. In 2011, HTML5 was created, which provides graphic and multimedia capabilities without the need of client side plugins. HTML5 also enriched the semantic content of documents. The APIs and document object model (DOM) are no longer afterthoughts, but are fundamental parts of the HTML5 specification. WebGL API paved the way for advanced 3D graphics based on HTML5 canvas and JavaScript language. These have significant importance in creating truly platform and browser independent rich web applications.

E-Learning Technology

Developments in e-learning technology have modified our method of life, whether or not it's reception, at work, in class or at leisure. The net and therefore the development of digital technology (computer-based technology) specifically, have created the foremost vital impact within the field of e-learning technology within the past decade.

The codes of ethics have emphasized that a teacher should manage his, participate actively in seminars, conferences, etc and should participate in the activities of professional organizations. In relation to his students, he should be affectionate, supportive tend to tend to anyplace.

The e-learning technology and impartial and in no case should be vindictive. He is relied upon to endeavor persistently to teach among understudies' logical viewpoint, regard for the vote-based system, peace, national legacy and national objectives. He should shun impelling understudies against different understudies, educators or organization and from hotel unconfirmed affirmations against associates or organization. He is relied upon to release his expert duties as per the tenets and should avoid tolerating private educational costs and instructing. An instructor should treat the non-showing staff with deference. He is additionally anticipated that would keep the understudies' watchmen educated about the advance of their wards. He ought to know about social issues and ought to contribute to their evacuation. The two codes are almost identical in content and spirit and differ only in minor details or terminology.

3. Review of Work

Alexander W. Wiseman (2017) How does instructors' sexual orientation impact their e-learning innovation based direction in Saudi Arabian government schools? Utilizing one of kind information gathered in Riyadh, Saudi Arabia, in 2014, the examinations exhibited here demonstrate that male and female educators in middle of the road school classrooms contrastingly utilize e-learning innovation.

Jeretta Horn Nord (2017) Information and communications technologies (e-learning) provide global connections, communication, and empowerment. Empowerment drives social and economic development. This study, part of an ongoing global study, investigated the use of social technologies including the purposes used and benefits realized in Italy as a means of empowerment for women.

Yen-Chun Jim Wu (2017) E-learning innovation instruments are by and large progressively used to encourage instructing in instructive organizations. This investigation inspected the mentalities of understudies and educators towards utilizing e-learning instruments in administration instruction. Instantly subsequent to leading workshops that presented 11 e-learning devices utilized as a part of classroom settings, surveys were managed to understudies and teachers from three state funded colleges in Taiwan. Reactions of 242 understudies and 46 educators with respect to 5 spaces of e-learning apparatuses - input, classroom versatility, distributing, cooperation, and online networking - were dissected to explore their disposition towards the utilization of e-learning.

Maja Seric (2016) The objective of this examination is to inspect customers′ view of the most recent innovation arrangements and promoting interchanges inside the lodging setting in two Mediterranean nations - Croatia and Italy. Specifically, inn visitors of four-and five-star lodgings situated in these nations took an interest in the exploration. Right off the bat, visitor impression of cutting edge E-learning innovation and correspondence consistency are dissected and thought about in Croatian and Italian inns.

Martin Gould (2015) Purpose: This examination presents 2013 information from an overview gave by G3e-learningand Disabled Peoples International (DPI). The Progress Report recognizes the degree that each of the CRPD attitudes on ATs and e-learning openness are instituted in nearby laws, arrangements and controls and their effects. Strategy: The underlying system used to build up the study included a few stages. Initial, an orderly survey of CRPD AT and e-learning innovation necessities was led. Second, 57 factors were recognized. Third, factors were gathered into three bunches speaking to nations': (a) legitimate, administrative and automatic responsibilities; (b) ability to execute; and (c) genuine usage comes about.

Hong Y. Stop (2015) User information has been a vital wellspring of novel item improvement and advancement, yet assembling exact client learning has been tedious and troublesome in light of the fact that client learning is implicit and internationally scattered. Be that as it may, e-learning innovation can extend the limits by making client information less demanding and more affordable to get to. Structures and associations are developing to play out the undertaking of client data gathering.

Narcyz Roztocki (2015) In this examination we survey the distribution base and the exploration slants in e-learning innovation particularly on the move economies. We restrict our investigation to work distributed in scholarly diaries and managing e-learning in nations that have suddenly nullified a midway arranged economy and one-party controlled political framework for a market-driven economy. We lead a writing survey and dissect the inspected examines taking a gander at investigate center, explore approach, and hypothetical establishments. In light of 173 examinations distributed in the vicinity of 1993 and 2012, we watch a few patterns and predominant subjects and distinguish holes in the writing and open doors for future research.

Jimmy K.N. Macharia (2014) Previous investigations have demonstrated that in the advanced education area, e-learning innovation gives the driving force to transform from the conventional ideas of instructing and learning, and prime inspiration driving the change in academic and expert exercises. This underscores the significance of e-learning in advanced education in accomplishing the objective of giving adaptable instructing and learning conditions.

Angelina Totolo (2014) School librarianship has progressed in the computerized time to incorporate intelligence, network, and access to a wide assortment of data in various arrangements, through the abilities of e-learning advancements. School libraries exist to help learning in schools and the significance of the advanced age in understudy's learning can't be exaggerated. The present understudies are conceived in the time of innovation; in this way a school library that does not include the utilization of electronic media won't address the issues of the computerized age.

Laura Stafford (2012) Despite the pervasive penetration of data correspondence innovations into our lives, examine on their parts in individual connections is at a beginning stage. In this exposition, we quickly survey the rise of research on e-learning and outline momentum drifts in the investigation of e-learning and individual connections, including subjects, for example, multi-correspondence, media multiplexity, and unending network.

Mary Kalantzis (2012) In this snapshot of gigantic change, putting resources into old methods for doing instruction isn't the most ideal path forward. In offering a Charter for Change we perceive that information and learning will be critical to the social and individual changes important to address the particular difficulties of our circumstances. The changed monetary framework rising up out of the current budgetary emergency will require human limits that no one but instruction can support, in view of profound learning, pragmatic creative energy, imaginative investment, scholarly curiosity and synergistic duty - not simply with respect to an information tip top, yet of the numerous in the work compel and in the more extensive society.

Robin Shields (2011) The utilization of data and correspondences innovation for instruction in creating nations has been a subject of awesome premium and theory, with its advocates contending that e-learning enhances instructive quality, creates basic reasoning abilities, grows get to, increments monetary aggressiveness and encourages incorporation in a quickly extending worldwide data society. In any case, few of these cases have been confirmed from an exact point of view, prompting significant feedback of the push to extend e-learning.

Stephen J. Fox (2010) Multi-disciplinary multi-national instruction and research in building design, building, development, and activity (AECO) can include members with various first dialects as well as various previously established inclinations. Further, AECO training and research can include unverifiable and developing circumstances and additionally geologically scattered associations.

Jack Linchuan Qiu (2010) This examination surveys Asian versatile correspondence look into since the mid-1990s. Initially, it distinguishes key research establishments and financing offices, in Asia as well as overall open (e.g., the Canadian IDRC) and private (e.g., Microsoft) associations. It at that point compresses the regions of research at miniaturized scale, meso, and full scale levels, including their fundamental themes, techniques, and discoveries, and open deliberations that outcome from the association (and absence of it) among various insightful customs, for example, review, strategy investigation, ethnography, activity research, and relative examinations.

Nelly P. Stromquist (2009) Practices of information securing, correspondence and collaboration with others have changed considerably with the coming of new, developing, and far reaching e-learning advancements. Particularly among the more youthful ages, understudies' miens toward learning are moving toward a requirement for more noteworthy visual and sound boosts, speedier speed in access to data and reward, shorter capacities to focus, engagement in different assignments while imparting, and more prominent individual office in learning.

Deborah Edwards et al. (2009) with desire significance execution examination assembled thirty-nine qualities into five classes: 'city condition', 'city encounter', 'scope of attractions' and 'nourishment administrations'. Local and worldwide travelers vary in their desires of, saw significance of and execution of, goal properties. This show overseeing desires and goal credits to these two expansive market fragments will require diverse techniques.

4. Method and Methodology

The present study performs a systematic and exploratory analysis approach to investigate the impact of techniques on education.

The research methodology of this study will be depending upon collection of facts and data. A quantitative approach will be used to enable the researchers to collect data. Permission will be taken from the authorities concerned after explaining to them the purpose of the study. It is a study based on algorithms and tables. The Secondary data contains, data will be collected from various sources like journal, books and various website from internet.

Formal Estimation Model

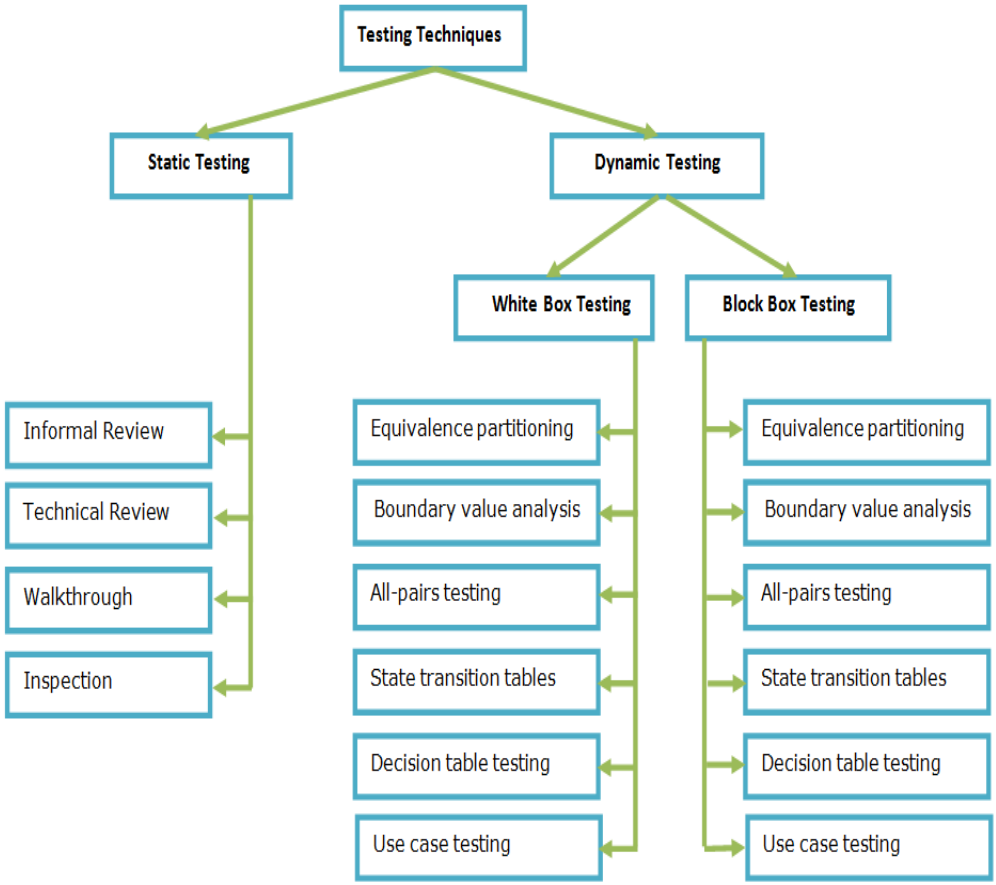
The quantification step is based on mechanical processes, e.g., the use of a formula derived from historical data.

Combination-based estimation: The quantification step is based on a judgmental and mechanical combination of estimates from different sources.

Below are examples of estimation approaches within each category.

Estimation approach	Category	Examples of support of implementation of estimation approach
Analogy-based estimation	Formal estimation model	ANGEL, Weighted Micro Function Points
WBS-based (bottom up) estimation	Expert estimation	Project management software, company specific activity templates
Parametric models	Formal estimation model	COCOMO, SLIM, SEER-SEM, True Planning for Software
Size-based estimation models	Formal estimation model	Function Point Analysis, Use Case Analysis, SSU (Software Size Unit), Story points-based estimation in Agile software development, Object Points
Group estimation	Expert estimation	Planning poker, Wideband Delphi

Mechanical combination	Combination-based estimation	Average of an analogy-based and a Work breakdown structure-based effort estimate
Judgmental combination	Combination-based estimation	Expert judgment based on estimates from a parametric model and group estimation



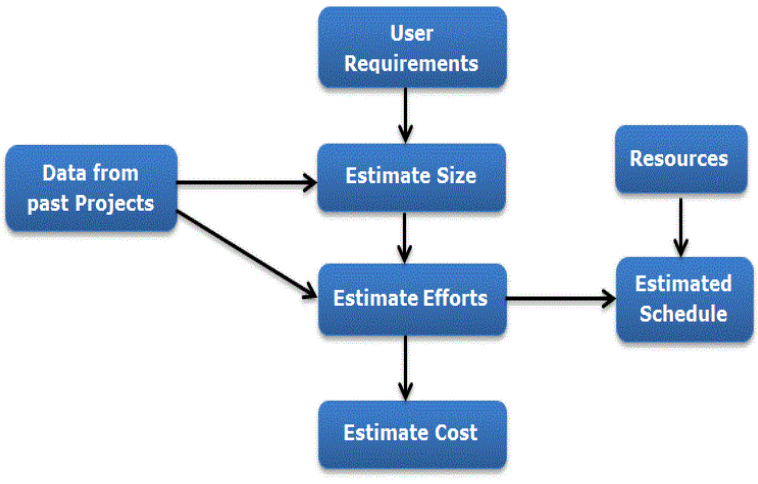
Estimation Accuracy

Accuracy is an indication of how close something is to reality. Whenever you generate an estimate, everyone wants to know how close the numbers are to reality.

The most common measure of the average estimation accuracy is the MMRE (Mean Magnitude of Relative Error), where the MRE of each estimate is defined as:

MRE = (Actual effort - estimation effort) / actual effort

All estimates are made based upon some form of analogy: Historical Analogy, Expert Judgment, Models, and Rules-of-Thumb. The role these methods play in generating an estimate depends upon where one is in the overall life-cycle. Typically, estimates are made using a combination of these four methods.



Below are 4 major steps (from Step 3 to Step 6) that play an important role in the estimation of the software project:

Important Factors for Estimating an e-Learning Course Development Time

Unfortunately this is not an easy and straightforward question to answer. As you can guess there are a number of factors that must be taken into consideration. In my opinion, the following 5 factors are the most important for estimating an e-Learning Course Development

- **Organizational need/deadline**
  Of course, one of the most important factors is your deadline. Depending on your deadline, you might cut your course a bit shorter, or you might slow the process down.

- **Instructional Design Model**
  With the use of an Instructional Design Model (IDM) you will not only ensure that learning is happen more safely, certainly, thoroughly, and expeditiously than might otherwise happen, but also you will save much of the e-learning course development time. Moreover, some courses will always be easier than others when it comes to design and development. Obviously, those who are more demanding will take time and you need to plan according to the needs of your course.

- **Complexity of the content**
  More complex instructional materials will take more time to prepare. This might also mean more meetings with your subject-matter expert and more attention to detail. More complex materials may require more complex material design and you are likely to have to go back and check everything again.

- **Types of media you use**
  Are you making a video, a power point presentation, or other interactive materials? Obviously videos require more preparation, effort and time. You will also need time to edit the materials later.

- **Learning Technologies and Hardware device**
  How quickly you will complete the design of your eLearning course, depends a great deal on the technologies you use and their speed and accuracy. If you use a Rapid Cloud-Based Authoring Tool you will decrease the eLearning course development time. Furthermore, technology sometimes gives up on us in the least desirable moment. For example, if you have ever prepared a course material for 3 hours and suddenly your computers decides to go nuclear seconds before you saved your data, this might cause further delays in the process.

- **Content Development**
  Very often, especially in small enterprises, the eLearning Project Manager, the Instructional Designer and the eLearning Developer may as well be the same person. If not, the latter will step in the project at this stage and start working on the storyboard.

- **Alpha stage**
  The alpha version is the first model of the course the client will get to see and it will include all the material the SME handed in, placed in the order the Instructional Designer suggested.
  It is highly recommended that all multimedia resources and any interactivity are inserted in the design at this stage. In other words, make it as complete as possible.
  The alpha version will then be reviewed by the client, who will provide their feedback.

- **Beta stage**
  It is very important that the customer's feedback is fully comprehended. Beta stage is nothing else other than the implementation of the amendments and changes they requested. This could mean anything, from a few minor adjustments to bringing back the Instructional Designer to review their strategy.
  Whichever the case and no matter what it takes, the beta version needs to be of much higher quality. It is the last model the client will see before the sign off. Any changes and amendments they may propose have to be as minor as possible. This is something that has to be very clear to all parties.

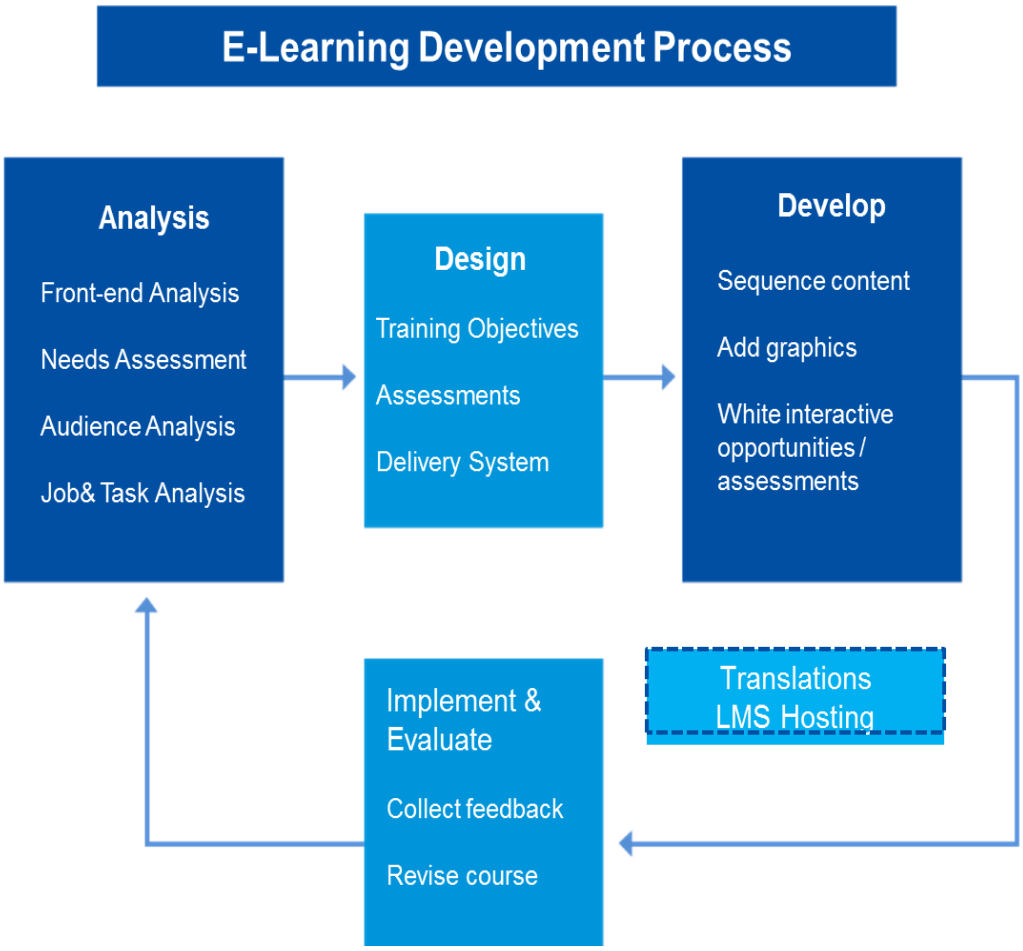
- **Gold stage/Sign off stage**

This is the final stage. The eLearning Developer acts on the feedback from the last review and tests the course on an LMS. As soon as the course is fully functional, it is ready to be signed off.

Creating content can be challenging, and maybe even daunting. It involves the following major steps:

- **Design and Development**

Now, let's see the different stages in eLearning design and development. The following diagram gives a bird's eye view of the entire process.



- **Analysis**
  This is the first step of the eLearning development process. At this stage, you need to analyze the learning content, learning objectives and the profile of the target audience. You also need to take a look at the type of job or tasks that the participants are expected to accomplish after taking the course. Based on this, a broad instructional strategy is formulated to decide on the best way to present the content.

- **Design**
  Next, learning experts need to create a design document that incorporates the recommendations of the learning management team. Requirements of the stakeholders, training objectives, and assessments required and design challenges are taken into account at this stage. This document also specifies the instructional, visual and audio elements to be included in the course curriculum.

- **Develop**
  The specifications in the design document are executed by incorporating the content, visuals and assessments into a storyboard. The page layout, graphic user interface and multimedia elements are all finalized at this stage and incorporated into the course. There are a range of rapid authoring tools today such as Articulate Storyline, Lectora, Captivate, etc., which can be used for giving a definite shape to your eLearning course. Using rapid authoring tools expedites the course development process considerably thanks to their in-built interactivities and templates. Check out this online video that explains how to zero in on the right authoring tool for your eLearning course development.

Testing Of Hypotheses

There exist two criteria for a good hypothesis. First, it is a statement about the relations between variables. Second, it clearly implies possibilities of empirical testing of the stated relationship. Thus, a hypothesis is a statement involving two or more variables which are measurable or at least potentially measurable and specifies the way in which these variables are related. A statement which does not meet these criteria does not form a scientific hypothesis. However, the exception to these criteria is the hypothesis formulated in factor analytic studies. The following hypothesis can be cited to show how these criteria apply to them:

1. Persons of higher level of intelligence will be less hostile than those of lower level of intelligence.
2. “More” and “Less” aggressive individuals will have significant differences in their personality patterns and in respect of some personality traits.

In the above examples, a relation has been stated between one variable, intelligence or personality and another variable, hostility. There exists the possibility of the measurement of the variables and thus, there is implication for testing the hypothesis. Thus, the two criteria are satisfied.

Like hypothesis, problems behind them are also significant. Research is frequently initiated with a problem or a problematic situation. At the very outset, there exists an indeterminate situation involving doubts and vague ideas with which the researcher is perplexed. Explicitly, without an exposure of such a perplexing situation, the problem cannot be formulated. In course of time, the indeterminacy is overcome and the researcher tends to have a clear idea of the problem rather than a general and diffuse notion.

The hypotheses needs to be further tested using the data collected from various sources. As stated above, hypothesis testing determines the validity of the assumption with a view to choose between two conflicting hypotheses about the value of a population parameter. Statisticians have developed several tests of hypotheses which can be classified as: - (a) Parametric tests or standard tests of hypothesis; and (b) Non-parametric tests or distribution-free test of hypothesis.

Parametric tests usually assume certain properties of the parent population from which we draw samples. Assumptions like observations comes from a normal population, sample size is large, assumptions about the parameters of population like variance, mean etc., must hold good before parametric tests can be used. But there are also such situations when the researcher either could not or does not want to make such assumptions. In such situations, we use statistical methods of hypothesis testing which are called non-parametric tests because such tests do not depend on any assumption about the parameters of the parent population. The testing of above given hypotheses for this study will be included in next chapters (Analysis of Data and Interpretation of Result).

5. Data And Algorithm

Most commercial websites use content management systems to enable site owners to add and maintain website content - copy, images, promotions, offers, and landing pages. These tools are similar to those found in a word processor, require no advanced HTML or programming skills, and help organize the extensive amount of content found in a typical website.

We offer personalized CMS services that meet the evolving demands and trends of today's e-business. We have developed a diversified range of CMS solutions utilizng varying technologies (.NET, PHP, opensource, etc) for our clients worldwide. Prior to developing a CMS solution for you we will consult with you to identify your CMS needs and then offer a CMS solution tailor-made to your specific business needs. Our expert and experienced developers, from the selection of a CMS solution to the strategic deployment of the CMS solution, will work to develop the best CMS for you to capitalize on the benefits most valuable to your website and business.

At i-CTC, our goal is not only to effectively develop, deploy and maintain content rich websites but also to remove the need

for ongoing, high-priced website maintenance. By hearing about our CMS experience and previous successful CMS implementations, you can be confident in our ability to accept and deliver even the most complicated projects.

Algorithm

- **Component**

  The algorithm consists of following component as shown in figure:

  - ***Collect Data***

    The LMS (Learning Management System) can be used to collect the student's usage and interaction information. It is an open-source course management learning system where we add categories and courses. We create the login of each student so that student can access and give the choice regarding the subjects; he/she is interested in. The course categories are shown in figure. The activity chart for student is shown in figure.

  - ***Database***

    It will store student's choices about the courses in database from where we can collect the data WEKA.

  - ***Data Preprocessing***

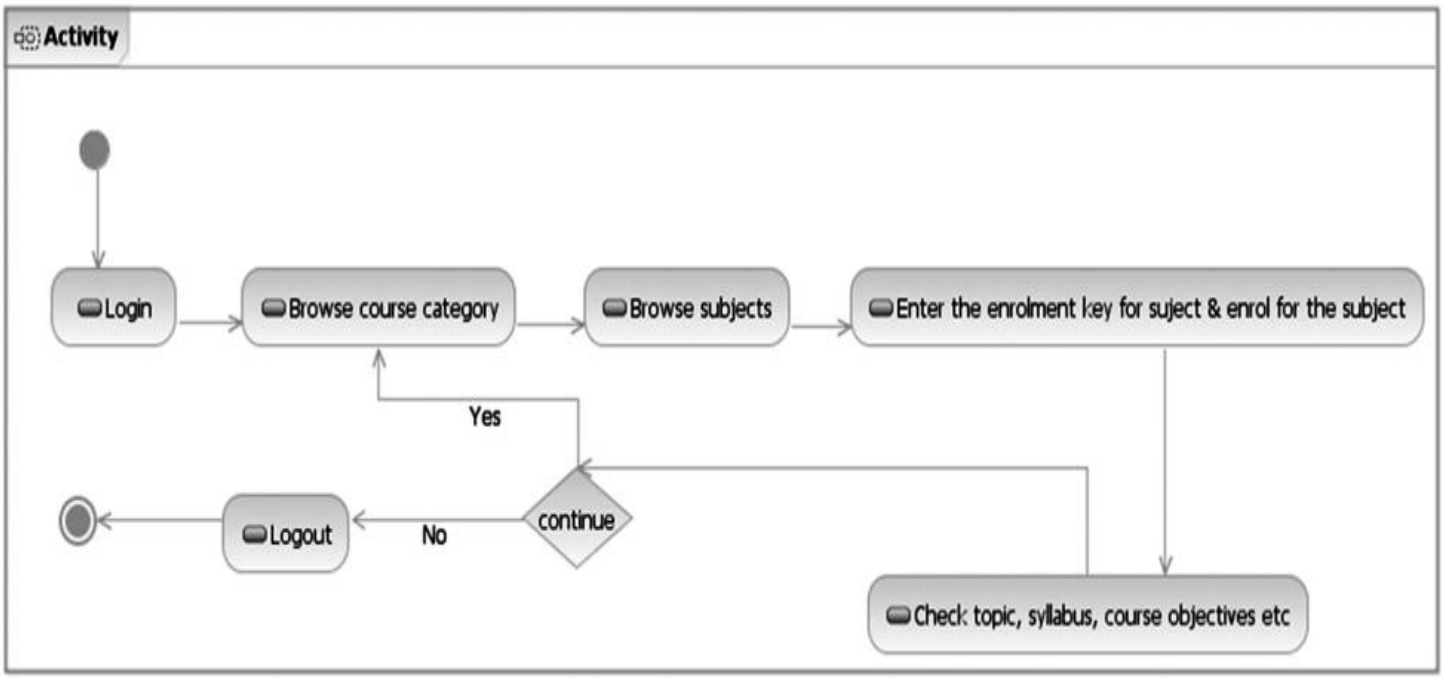
    The data is cleaned and transformed into an appropriate format to find the best combination of subject as the real world data is not suitable.

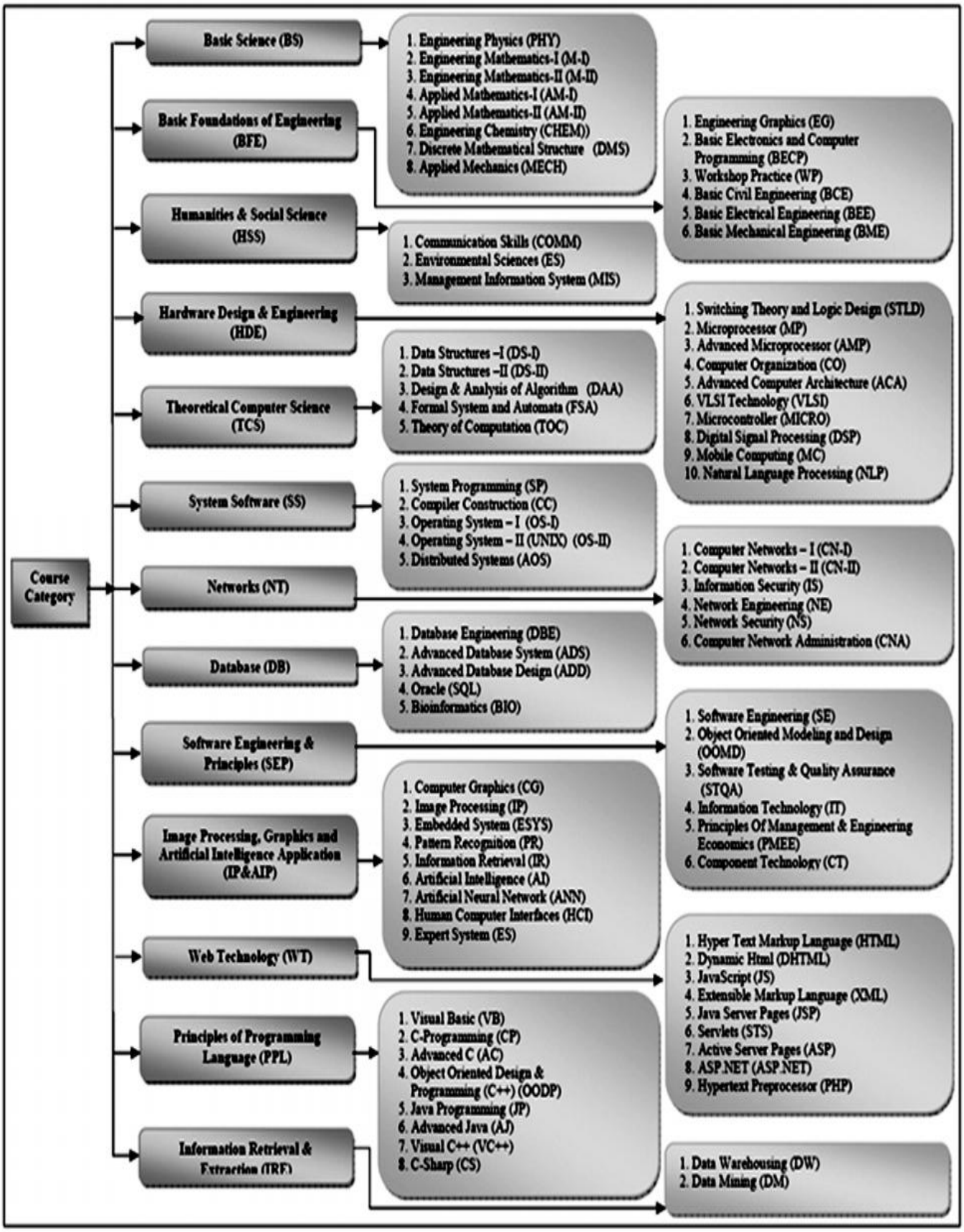
  - ***Result Using Data Mining Tool WEKA***

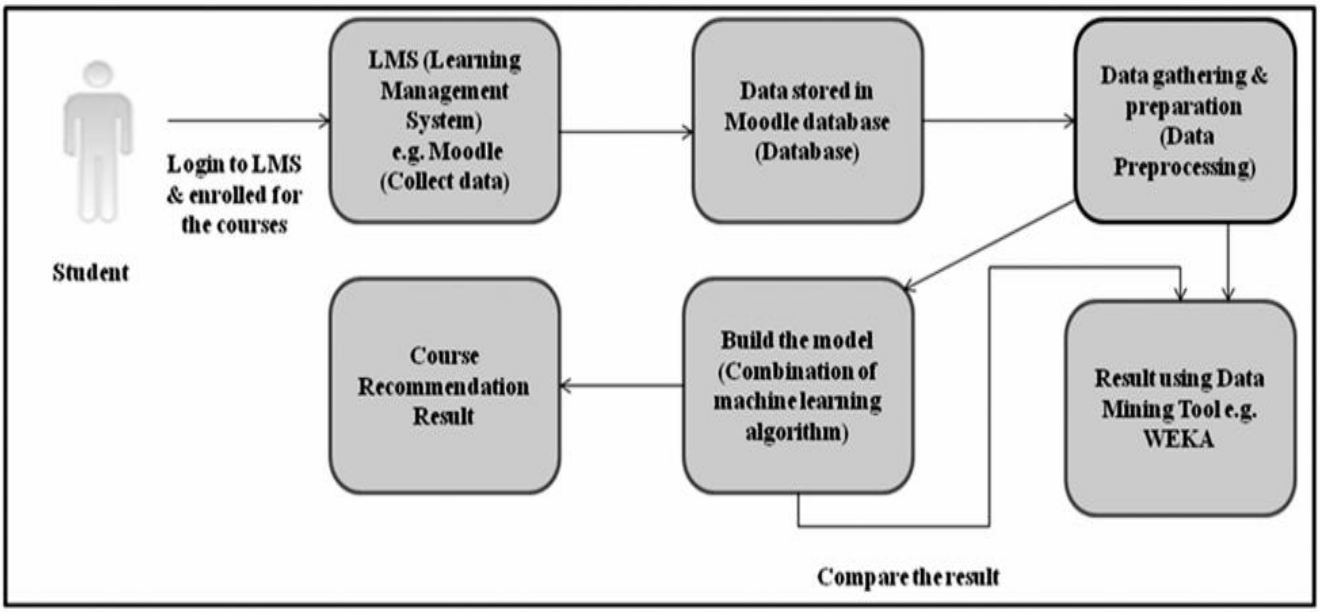
    The data mining algorithms are applied to discover and summarizes the knowledge of interest to the user i.e. to instructor, student and administrator. To do so, either a general or a specific data mining tool, or a commercial or free data mining tool can be used.

  - ***Build the Model***

    This is our module where we propose the algorithms which may be the combinations of various data tasks such as classification, clustering or association rule.







6. Proposed Model

The proposed model in pseudo code is given below

Step 1: Create Student Login.
Step 2: Add the course category & courses under each category.
Step 3: Allow the student to logs in the system.
Step 4: While user logs in the system
Allow user to view course category

- Allow user to view courses under each category
- Enroll for those subjects in which he/she is interested

Step 5: Select the data from database & analyze it.
Step 6: Preprocess the data obtained using database
Step 7: Check the best combination of subjects result using the open source data mining tool WEKA
Step 8: Develop the algorithm which may be the combination of various data mining algorithm.
Step 9: Compare the result of this algorithm with those obtained using the WEKA
Step 10: Display the best combination of subject result

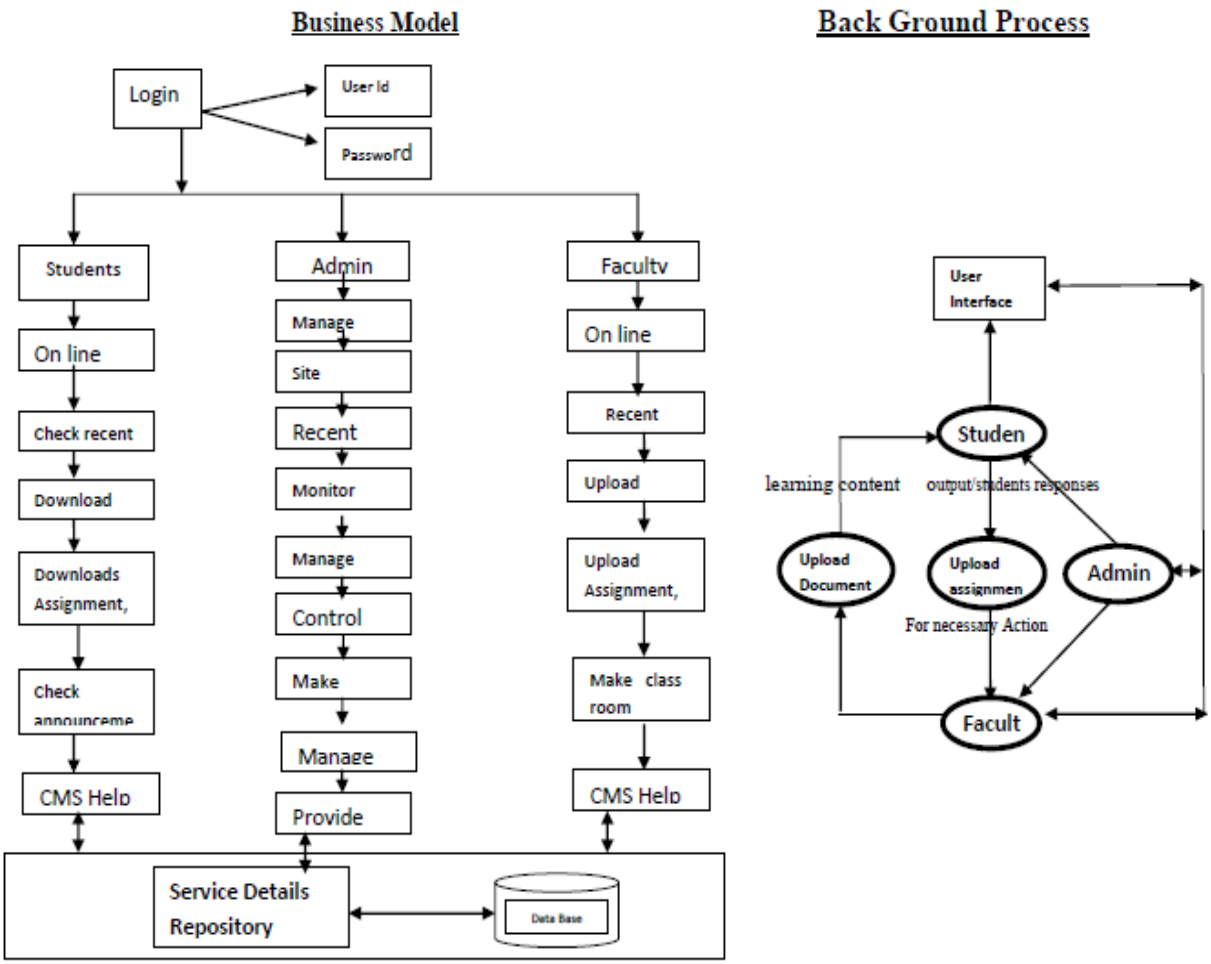
Class Mapper
Method Map (Docid, File of Objective)
For each line ε File of Objective
Write (Docid, line)
End for

Class Reducer
Method Reduce (Docid, List(line))
S ← NULL
For each n ε 2 List(line)
S ← S + n
End for
List ← Split(s)
Index (List & Learner's profile)
Result ← BuildingGA ()
Write (Result," ")

7. Implementation

It has developed e-learning model for the students studying at Business Schools in India. It has taken care of the three aspects content, technology and Process. In Content the students can see the class room lectures, syllabus, lesson plan, assignments, notices, timetable, and companies for placements or trainings. They can even see the results. The faculty can upload all the

contents required by the students or is mandatory for all to see and act. It uses web based technology (WBT). There is an administrator (the process owner) who controls the basic menu functions and sees the smooth working of the system. This model has made the task easier faster and comfortable to the students and the faculty members.



8. Analysis and Interpretation

Comparison of Various WEB CMS

Comparing your current CMS with the capabilities of First Spirit™:

A comparison of CMS systems should always be based on a company's actual requirements. We've provided the following items to help simplify the CMS comparison process for you. The links at the end of the text provide additional information to assist you in your CMS comparison.

Drupal

Drupal is another popular Content Management System Software which has grown in popularity since it was launched and has a strong base of developers and followers and users.

In 2000, in order to share the ADSL connection between a few students at University of Antwerp, Dries Buytaert and Hans Snijder setup a wireless bridge. On the bridge Dries also launched a small internal news site with built in web board to allow the members to stay in touch. Later he launched the site under “drop.org” (original intention was to launch the site as “dorp.org” where ‘dorp’ means ‘village’ in Dutch). As the popularity of the site grew as well did the number of members, finally in January 2001, Dries decided to release the software behind the drop.org as “Drupal”. The idea was to allow others to use and extend the platform. The word Drupal derives from the English pronunciation of Dutch word “drupel” which means “drop”.

Joomla

Joomla! is an open source content management system platform for publishing content on the world wide web and intranets as well as a MVC web application framework. It is written in PHP, stores data in MySQL and includes features such as page caching, Really Simple Syndication (RSS) feeds, printable versions of pages, news flashes, blogs, polls, search, and support for language internationalization.

Joomla! is an open source PHP & SQL based application that’s really easy to learn, easy to navigate and allows us to build fantastic websites even if we’re a stranger to PHP and the Joomla! environment.

Joomla! came into existence as a result of the folk of the Mambo (another popular open source WCS), when its development team quit and started off Joomla! The name Joomla! Was derived from an Arabic and Swahili word

"jumla" meaning "all together" or "as a whole" Joomla! 1.0.0 Which was primarily a re-branded release of Mambo 4.5.2.3. Joomla! Won the Packt Publishing Open Source Content Management System and the popularity grew day by day.

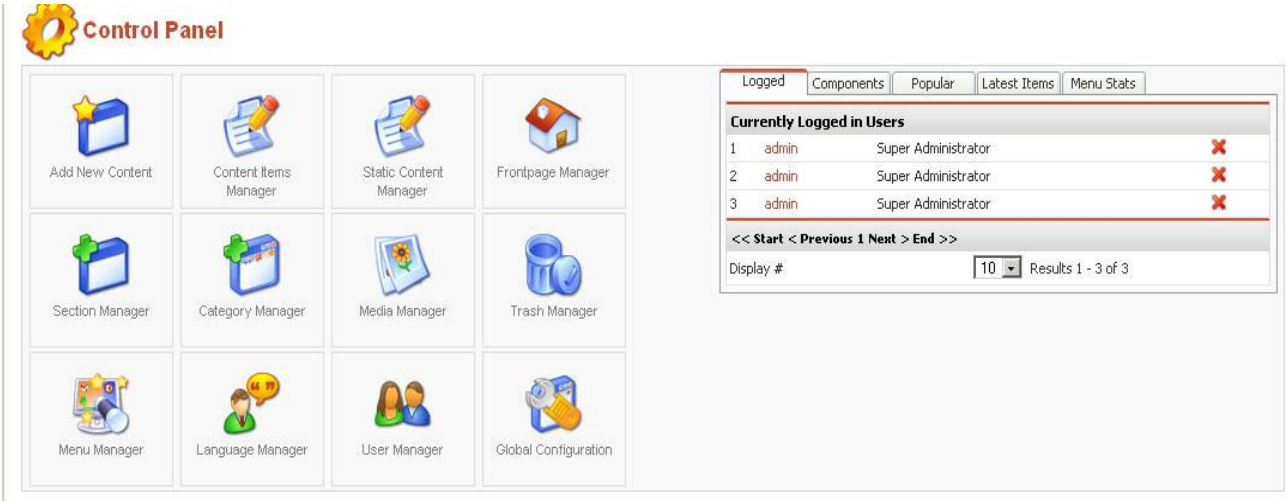


Figure: Joomla Admin for Web Content Management System

Joomla! Version 1.5 introduced The Three Tiered Framework and The MVC design pattern that enhanced the product capabilities significantly. Some of the notable results of the enhancements were:-

1) Code manageability became easy and standards bases.
2) Code quality improved and making the product more stable.
3) Helped bring about standardization in community developed extensions.

DotNetNuke

DotNetNuke is an open source platform for building websites based on Microsoft .NET technology. It is written in VB.NET and distributed under both a Community Edition BSD-style license and a Professional Edition proprietary license. It is extensible and customizable through the use of skins, modules, data providers, language packs and templates.

In January 2002, Microsoft Corp. published a download named the IBuySpy Protal to demonstrate how to implement specific functionality of ASP.net 1.0 platform. Though it was functional yet it lacked the features needed by the developers. Thus on December 24th 2002, Shaun Walker released a modified version of the original IBuySpy Portal with enhancement and innovative features. As it was made available on the developer network, its popularity among the developers grew rapidly and on February 28, 2003 was named DotNetNuke. In September, 2006 along with some of his long-time associates Shaun Walker formed DotNetNuke Corp.

WordPress

WordPress is an open source blog publishing application powered by PHP and MySQL which can also be used for content management. It has many features including plugin architecture and a templating system. Used by over 2% of the 10,000 biggest websites, WordPress is the most popular blog software in use today. WordPress was born out of a desire for an elegant, well-architectured personal publishing system built on PHP and MySQL and licensed under the GPL. It is the official successor of b2/cafelog. WordPress first appeared in 2003 as a joint effort between Matt Mullenweg and Mike Little.

Figure: WordPress Admin Control Panel

WordPress is not PHP, rather powered by PHP, but uses a simple template system which uses PHP for its

designing but to use it one doesn't have to know PHP. The intuitive and easy-to-use administrative interface makes it real simple and easy to create great looking blog or website in less time. Some of the features of WordPress that led to its popularity among the users are:-

- Full W3C standards compliance
- No need for regenerating static pages to reflect changes
- Ease of managing non-blog content
- Intelligent text formatting and work-flow
- Support for multiple authors
- Inbuilt spam protection and Password Protected Posts
- Support for comments on posts
- Cross-blog communication tool
- XML-RPC interface

Comparative Analysis of Web CMS

There is a large number of web-authoring software like FrontPage, Dreamweaver etc. that are used to develop and maintain the websites. But gradually, it became difficult to maintain and update the websites because of their very dynamic nature and a variety of file formats. Distributed Web Content Management Systems (CMS) evolved as an alternative to such web-authoring tools. There are many CMS Like Joomla, Drupal, .Net Nuke, PHP Nuke, Mambo, Sitecore, SharePoint etc., but this research work will deal with a comparative analysis between Joomla and Drupal.

The goal of this comparative study is to find the better Distributed Web CMS of the two according to various selected criteria. The criteria includes installation, platform support, browser support, modules and extensions, documentation, support, user management, multimedia integration, content creation and searching.

Earlier web CMS was based on mainly LAMP technology, But Now almost all software companies trying to develop the Web CMS.

Comparison

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	DotNetNuke Professional Edition 5.4	Drupal 6.10	Joomla! 1.5.10
Last Updated	5/10/2010	2/26/2009	1/11/2009
System Requirements	DotNetNuke Professional Edition 5.4	Drupal 6.10	Joomla! 1.5.10
Application Server	IIS/.Net	Apache	CGI
Approximate Cost	US$1,999 per year	Free	Free
Database	MSSQL	MySQL	MySQL
License	Open Source	Open Source	Open Source
Operating System	Windows Only	Platform Independent	Platform Independent
Programming Language	Other	PHP	PHP
Root Access	Yes	No	No
Shell Access	Yes	No	No
Web Server	IIS	Apache	Apache
Security	DotNetNuke Professional Edition 5.4	Drupal 6.10	Joomla! 1.5.10
Audit Trail	Yes	Yes	No
Captcha	Yes	Free Add On	Free Add On
Content Approval	Yes	Yes	Yes
Email Verification	Yes	Yes	Yes
Granular Privileges	Yes	Yes	No
Kerberos Authentication	Free Add On	No	No
LDAP Authentication	Free Add On	Free Add On	Yes
Login History	Yes	Yes	Yes
NIS Authentication	Free Add On	No	No
NTLM Authentication	Yes	Free Add On	No
Pluggable Authentication	Yes	Yes	Yes
Problem Notification	Yes	No	No

Figure: Comparative Analysis of DotNetNuke, Drupal and Joomla

Price investigated the problem related to manage a fire department website that was growing in size and complexity. He presented the solution through determining efficient and sustainable processes to assure high quality online communications. He also presented a case to deploy enterprise web content management systems.

Sol[3] Observed that on the web, content is king. Regardless of how your web site looks, once the content is in place, it is essential that time and energy is spent in thinking about how to present that content on the web. Like any medium, the web has its own quirks and intricacies that make content distribution different from other mediums such as print, radio, or television.

After analyzing the previous developments in the area of Web CMS it was found that even after finding solutions for many problems, there exist certain problems like unavailability of dynamic content management, Security issues, Complexity involved in repositories management and

administration related issues that need the attention of researchers as well as practitioners. These problems motivated to explore better solutions for them and in distributed Web CMS major concerns are about advancement of repository management, security as well as administrative issues.

Drupal is extremely developer friendly. Strong community to help discern the dozens (hundreds) of functions and tags available. It can be used to create some really awesome websites that can outperform a majority of other sites out there.

It is not very designer and user-friendly. It's hard for someone with little code knowledge to make the leaps required to do the very cool things that Drupal is becoming known for. Theming of Drupal has been a huge case of fail (until recently). Probably because it has been developers, not designers, that are making the themes. Getting a Drupal website published could cost you more time, and thus more money, than WordPress or Joomla.

WordPress is simple to use, i.e., no need for modifications. It is excellent for blogging or sharing thoughts in a sequential manner and is even the most elderly of users can get the hang of it quickly.

Joomla! is friendly for all types of users ,i.e., Designers, Developers and Administrators. It has been rapidly growing and improving itself for the past three years and a huge community is awesome for assisting with creation of websites**.** With all such features Joomla! is still not user-friendly enough for everyone to understand. It is not quite as powerful as Drupal, and can be a bit confusing for some to jump into. Recently rebuilt the entire system from ground-up, and so there are still many out there sticking to the old versions.

Although it is not developer friendly and the community seems to like to complain. Installing upgrades bring more bugs than fixes sometimes.

Table: Comparison between Different Techniques

Features	**DotNetNuke 5.0.0**	**Drupal 6.10**	**Joomla 1.5.10**	**WordPress 2.1.1**
Database	MSSQL	MySQL	MySQL	MySQL
Database Creation	Manual	Manual	Automatic	Manual
Operating System	Windows only	Platform Independent	Platform Independent	Platform Independent
Programming Language	VB	PHP	PHP	PHP
Captcha	Yes	Free add on	Free add on	No
Kerberos Authentication	No / Free add on	No	No	No
Drag-N-Drop Content	Yes	Free add on	No	Yes
Image Resizing	Yes	Free add on	Yes	Limited
Spell Checker	Free add on / Yes	Free add on	No	Free add on
Zip Archives	Yes	No	No	Free add on
Advanced Caching	Yes	Yes	Yes	Free add on
Database Replication	No / Yes	Limited	No	No
Static Content Expert	Yes	No	No	Limited
Package Deployment	Yes	No	No	No
Trash	Yes	No	Yes	No
FTP Support	Yes	Limited	Yes	Free add on
CGI-mode Support	No / Yes	Yes	Yes	No

Multi-lingual Content	Free add on / Yes	Yes	Free add on	Free add on
Chat	Yes / Costs extra	Free add on	Free add on	Free add on
Discussion / Forum	Yes	Yes	Free add on	Free add on
Graphs and Charts	Yes	No	Free add on	No
HTTP Proxy	Yes / Costs extra	No	No	No
Search Engine	Yes	Yes	Yes	Yes
Inventory Management	Costs extra	Free add on	Free add on	No

WordNet Website Deployment Using Content Management

WordNet is an important lexical resource for a language which helps in Natural Language Processing (NLP) tasks such as machine translation, information retrieval, word sense disambiguation, multi-lingual dictionary creation etc. WordNet is designed to capture the vocabulary of a language and can be considered as a dictionary cum thesaurus and much more (Miller, 1993), (Miller, 1995), (Fellbaum, 1998). The IndoWordNet is a linked structure of WordNets of major Indian languages from IndoAryan, Dravidian and Sino-Tibetan families. These WordNets have been created by following the expansion approach from Hindi WordNet which was made available free for research in 2006 (Bhattacharyya, 2010).

Most of these language WordNets have reached the necessary critical mass required to open them for public and research use. Feedback from users was the next step to further improve the quality of these resources and increase their usability. Hence, the Consortium decided to make all these WordNets available for public feedback and validation of synsets through online deployment. It was also desirable to have standardisation across all WordNet websites with respect to the user interface, functionality, storage, security, etc. After considering schemes such as Wiki, Blog, Forum and Content Management System we realised that Content Management System was the best option available to publish WordNet content.

We also evaluated freely available CMS's like Jhoomla, Seagull, PHP-Nuke, etc. and concluded that these CMS's were bulky for the task that we set to achieve. From maintenanace point of view it was desirable that non-technical person should be able to create and maintain the website with minimal effort and time. So a decision was taken to develop a new CMS for website creation.

9. Databases Used

We have also implemented a relational database to store the WordNet data. This database design (IndoWordNet database) supports storage for multiple WordNets in different languages.

The design has been optimised to reduce redundancy. The data common across all languages is stored in a separate database and its size is 1.8 MB. The data specific to a language is stored in the database of respective language. The database size may differ from language to language depending on the synset information. For Konkani the size of this database is 7 MB for thirty thousand synsets. An object-oriented API (IndoWordNet API) has also been implemented to allow access of WordNet data independent of the underlying storage design. The IndoWordNet API allows simultaneous access and updates to single or multiple language WordNets. The heart of the WordNet CMS is a database (CMS database) that stores all the CMS data which is necessary to deploy all the implemented modules. The size of the CMS database is 1 MB for Konkani and should be the same for others.

Framework and Design of WordNet CMS

The block diagram of WordNet CMS is shown below in figure 1. An important feature of WordNet CMS is a customizable template, to customize the overall look and layout of a site.

A template is used to manipulate the way content is delivered to a web browser. Additionally using CSS within the template design, one can change the colours of backgrounds, text, and links or just about anything that one could within an ordinary XHTML code. The designs for these are all set within the template's CSS file(s) to create a uniform look across entire site, which makes it easy to change the whole look just by altering one or two files rather than every single page (Brinkkemper, 2008).

Template also provides the framework that brings together default functionality and features implemented through modules. Functionality and features can be customized or added by the user by customizing the default modules or adding new modules. This offers advantage over traditional websites where such change needs redesign of the entire website. The navigation menus and links are also auto generated to reflect these changes.

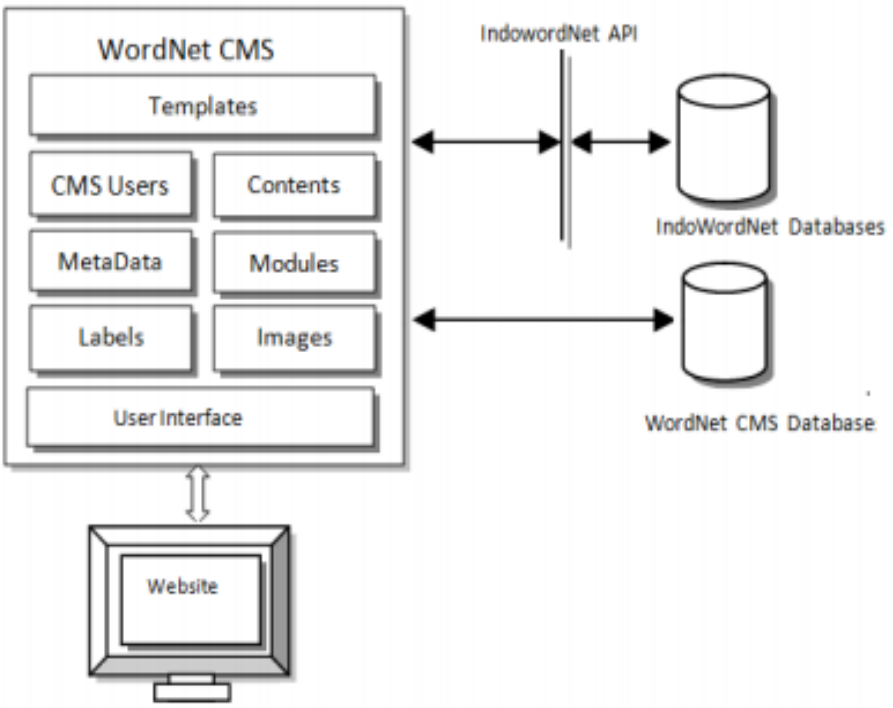


Figure: Block Diagram of WordNet CMS

WordNet CMS Modules

A module is an independent component of WordNet CMS which offers specific functionality.

These modules depend on CMS database. While the addition of new modules does not require any changes to the CMS database, new tables may need to be added to store data specific to module functionality. Presently there are six default modules, namely Web Content module, FAQ module, WordNet module, Word Collection module, Terminology module, and Feedback module.

1. WordNet module: Provides online access to the WordNet data. The basic functionality supported are search for synsets containing a word, access synsets related through semantic and lexical relationships and compare two or more synsets.
2. Web content module: Textual or visual content that is encountered as part of the user experience on websites. A wide range of content can be published using the CMS. This can be characterised as: simple pages, complex pages, with specific layout and presentation and dynamic information sourced from databases, etc. The examples of Web Content are Introduction, About WordNet, About Us, Credits, Contact Us, etc.
3. Frequently asked questions (FAQ) module: Listed questions and answers, all supposed to be commonly asked in some context, and pertaining to a particular topic.
4. Terminology module: The technical or special terms used in a business, science or special subject domain. For WordNet CMS, it is a vocabulary of technical terms used in Natural Language Processing.
5. Words Collection module: The list of all words available in synsets of a particular language. Selecting a word opens its synsets WordNet module.
6. Feedback module: Valuable feedback from visitors and users of the website that helps to improve the overall experience of the site, and its contents. Feedback can range from general visitor's views, comments, and suggestions to discrepancies in synset data and complaints.

The CMS also supports creation of multilingual user interface for the website and customizable on-screen keyboard for all languages. The multilingual user interface is supported through suitably implemented Content and Label components of the CMS. Role based access mechanism is available to restrict access to certain parts and features of the CMS to different users. The WordNet CMS also allows control of Meta data embedded in the generated web page so as to reflect the content on each page as well as provide search engines clues to how the web page should be handled. The WordNet CMS supports both left-to-right and right-to-left text rendition and allows adjustment of the layout as per direction in which content language in written through a simple setting of a flag.

Architecture of WordNet CMS

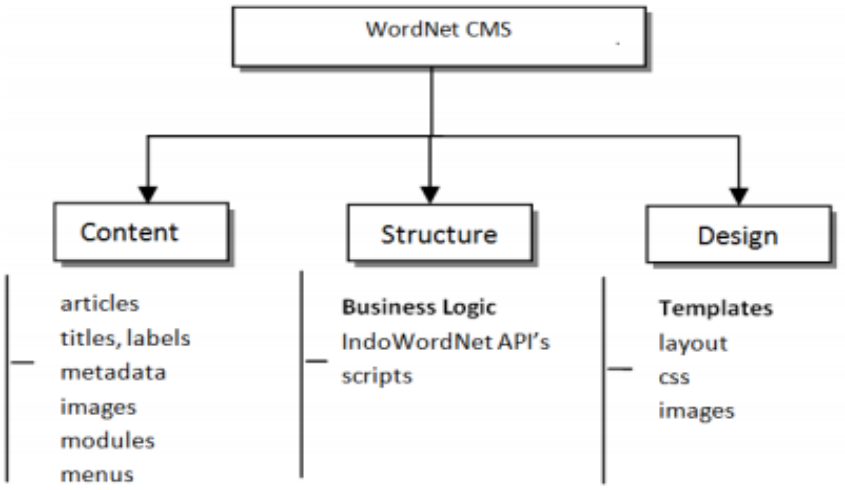


Figure: Architecture of WordNet CMS

As seen in figure above the WordNet CMS is implemented in three layers: Design, Structure, and Content. The functional division among these three layers allows many advantages throughout the life cycle of the website deployed using CMS. Each layer of the CMS can be recreated and adjusted independent of the other layers.

The Design layer can be completely reworked for a new user interface without the need for any adjustments to Structure or Content. The Structure layer can be enhanced for additional functionality with no changes required to Design and Content. Content layer can be changed with no need to adjust the front-end design or functional structure. This three layer architecture makes CMS highly flexible and customizable as per user requirement.

Implementation and Deployment Details

The WordNet CMS is developed using PHP scripting language and can be hosted on any Web Server which supports PHP version 5.3.15 and above. Currently MySQL version 5.5.21 is used as database. The CMS development was done using XAMPP on 32 bit Microsoft Windows platform. These softwares can be downloaded from their respective sites. The Konkani WordNetwebsite created using WordNet CMS has been deployed on Fedora 16 Linux Platform using Apache version 2.2.22 and MySQL version 5.5.21 which come bundled with Fedora 16 Linux Platform.

10. Result

The graph in figure 3 below shows the average number of days required to build and deploy the website using the traditional method and using WordNet CMS. The total time taken to develop WordNet website using traditional method was around 47 days. It took 7 days to design the layout and template of the website, 30 days to implement the website and 10 days for the deployment phase. In case of websites which were deployed using the WordNet CMS, the number of days taken was comparatively very less. For the design phase, it took 2 days to design the layout and template, the structure remains the same and therefore hardly any time was spent on coding and debugging. It took another 2 days for the deployment phase.

Therefore the total number of days to create and deploy the website using the WordNet CMS was around 5 days.

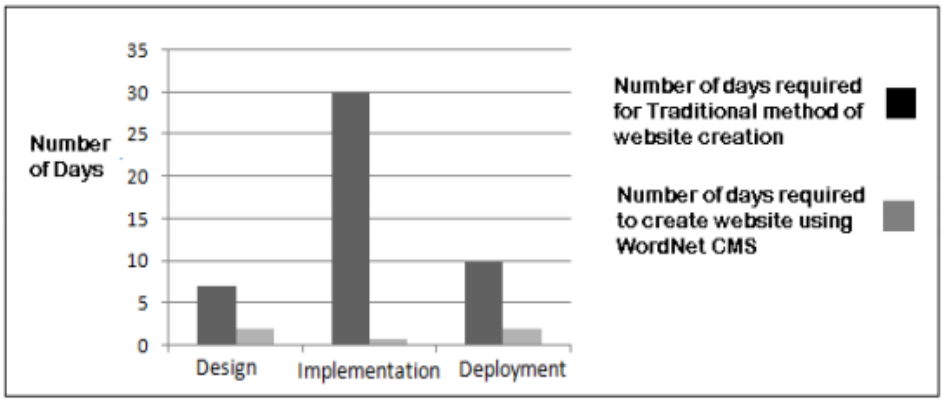


Figure 5.12: Deployment Time Requirement Analysis

From the above analysis, we conclude that the WordNet CMS can be used for the speedy deployment of WordNet websites with minimal effort, with good user interface and features by a non-technical content creator in a very short time for any language. The enhancements planned for the WordNet CMS are as follows:

- To develop an installation wizard so that the installation of the CMS is automated.
- Implementation of Reports module. This will help to keep track of the users visiting the website, provide statistics related to validation of synsets, feedback tracking, etc.
- Allow further customization of website user interfaces by the website user depending upon the user category such as students, teachers, researchers, linguists, etc. for better user experience.

The WordNet CMS has been successfully used by many IndoWordNet members to design their own language WordNet website.

11. Discussion

In e-learning application, there is no single method which produces the accurate estimates across the every step in the content development process. Following table shows the three basic activities which are performed during the content development process and categorizes complexity level of the work based on the given parameters. These data has been summarized based on the live educational e-Learning projects developed.

Content Development Activity	**Parameters**	**Details of Metrics**		
		Simple	**Average**	**Complex**
Storyboard Creation	No. of Screens	10 - 15	16 - 20	more than 20
	Text	20%	50%	80%
	Pictures	80%	50%	20%
	Characters	2 to 4	4 to 6	more than 6
Media Development	Graphic format	Raster graphics	Rater and Vector graphics	Vectors graphics
	Animations	20% graphically controlled	50% graphically controlled and 50% programmatically controlled	100% graphically controlled
	Illustrations	static characters	characters with animation	animated characters with conversations
Functionality Development	Interactive elements like clickable or moveable objects	Static and similar objects. They are available on screen.	Static and dynamic objects.50% objects are randomly generated.	All dynamic objects and generated randomly.
	Skinning and Text	Default provided by tool.	Default provided by tool and created by code.	100% created by code.
	Components	All default components are used.	50% default and 50% custom components	100% custom components

Above table clarifies that the content development process requires the expertise from the different fields not from the single field like in software development process where functionality-based models like function point analysis or COCOMO model can be used for the effort estimation. The next table analysis the various software engineering effort estimation techniques by measuring their strength and weaknesses and suggest their applicability for the effort estimation of content development process.

S.No.	**Techniques**	**Strength**	**Weakness**	**Applicability in Effort Estimation of the Content Development**
1	**Top Down Approach**- It looks the entire content of the courseware as whole and allocates the proportions of the effort estimates to the different activities of the content development process.	System level focus, Faster and easier and requires the minimum project details.	Provide the little details for justifying the estimates, less accurate and Underestimate the difficulties at low level.	It can be applied when the major activities of the content development are identified like storyboard creation, media development and functionality development.

2	**Bottom-up Approach -** Calculate the total effort from the sum of the effort estimation of single task.	Provides the most accurate estimates because it is based on detailed analysis at the low level task.	Requires the detailed knowledge of the project at the early stage of the project.	It can be applied when the total lesson plans and their interactivities along with their individual effort estimates are identified.
3	**Analogy Approach**	Based on the actual project data and past experience.	Similar projects may not be available and historical data may not be accurate.	It can be applied when the similar type of the content has to be developed like activities based on the similar templates like storyboard creation activity.
4	**Work Break Structure**	Give the structured way of the effort estimation of the each task of the projects.	Require the detailed knowledge of the projects that may not be available at the early stage of the project.	It can be applied when the similar type of the lesson plans or courseware to be developed and their tasks can be divided into the deliverable state like media development activity.
5	**Parametric Model** like Line of Code (LOC), Function Point (FP) Analysis, Constructive Cost Model (COCOMO)	It is very data oriented approach based on the predefined metrics which considers all the direct or indirect environmental factors.	It requires more subjective inputs. Weights are given based on the previous project experience and that may not reflect the current project environment.	These models can be applied in the functionality development activity where the programming skills are involved.

12. Conclusion

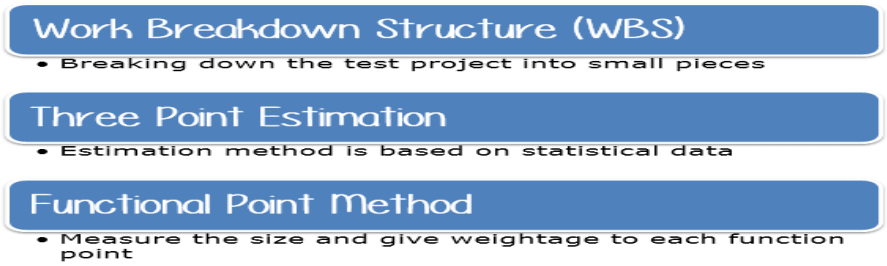
It is evident in Table 1 that although major ratio (i.e. 40%) of work effort is put in code and unit test phase. The rest 60 percent effort is put in different areas of the project development life cycle. Hence this signifies the importance of

Estimating cost for these phases of software development life cycle.

Activity	**Standard Work Effort%**
Definition Phase	
Business Requirements	6 %
Functional Specifications	10 %
Delivery Phase	
Detailed Design	14%
Code and Unit Test	40 %
System Testing	20 %
User Acceptance Testing	10%
Total Effort	100%

List of Software Test Estimation Techniques in e-learning module

- Work Breakdown Structure
- 3-Point Software Testing Estimation Technique
- Wideband Delphi technique
- Function Point/Testing Point Analysis
- Use - Case Point Method
- Percentage distribution
- Ad-hoc method



Use of technology to facilitate learning is accepted to be of value across educational institutions. Government of India has taken cognizance of the institutional support required for resources in e-learning and formulated the national mission on education through ICT. However, the focus is still largely on getting the infrastructure and creating the e-learning content. It is necessary to consider the individual factors that play an important role in the adoption of e-learning. For example, attitude of students and teachers towards e-learning may affect their acceptance of the technology in the teaching-learning process. While there have been studies to understand the factors of the instructors (e.g. release time for staff to engage in e-learning) and students (e.g. learning style) in acceptance of e-learning separately, a comprehensive view that considers both students and teachers in the same model is lacking.

How to calculate the cost of ILT vs. e-learning

Step 1

Calculate how much time your personnel spend developing your ILT, then do the same for proposed e-learning programs. Remember to factor in your full labor costs, including

benefits for each individual. Include time spent developing the initial training programs as well as time spent updating them. Consider including:

Subject Matter Experts
Trainers/Instructional Designers
Graphic Artists/Multimedia Designers
Management
Consultants
Others, such as Peer Review, Legal, Quality Assurance, etc.

Step 2

Calculate your "hard" development costs for ILT as well as proposed elearning, such as:

Printed materials
Specialty software used in material development
Training the trainers

Step 3

Quantify the cost to deliver ILT and e-learning. Remember to factor in the cost of the actual training session, as well as surrounding costs.

Cost of trainer's time
Cost of attendee's time (note: e-learning tends to cut ILT time in half)
Cost of having a consultant deliver the training, if you're using one
Cost of trainer's preparation time per session

Any ILT travel-related costs

Labor cost for trainer, employees, and possible consultant
Hard travel costs for trainer, employees, and possible consultant
Opportunity cost of trainers and employees' time, such as lost production
Cost for facility where ILT occurs
Cost of equipment used during ILT
Cost of refreshments during ILT

Remember to calculate total ILT and e-learning hours by multiplying the length of sessions times the number of sessions. Factor in all sessions, as trainers often repeat ILT sessions for new hires or employees who miss the initial training.

Step 4

Just a few more calculations:
Time spent coordinating the training
Time spent documenting the training activity
Time spent tracking ongoing training
Time spent analyzing the training

Blending Versus Pure e-Learning

Brandon Hall Research, a leading learning and development research firm, recently published some very interesting results of a large survey that, among other things, explored learners' and HR professionals' perceptions of comparative effectiveness among three platforms: pure classroom, pure e-Learning, and a blended combination of the two. The results weren't even close. Nearly 9 of 10 (87 percent) respondents said blended solutions were better than pure e-Learning. More surprising, about 71 percent said blended solutions were better than pure "face-to-face "solutions. > A curious bias?-Why this strong bias for blending modalities in learning initiatives? Wouldn't you expect most people to prefer the social comfort of the classroom if given a choice? The answer is probably multifaceted:

- As discussed earlier, different methods are better for different topics. Most learning initiatives have multiple, complex objectives, so it stands to reason that the diversity of desired learning outcomes requires a diversity of approaches.
- Another issue is what might be called "learning fingerprints." People like to learn differently, and sometimes even the same person finds preferences changing from day to day and topic to topic.
- Also, learners are just as interested in efficient use of time as their employers are. People like the asynchronous convenience of technology and its 24/7/365 availability. But they also understand that learning in real time with their peers is sometimes the best way to acquire certain skills. Thus, they prefer the blending of online cognitive overviews with in-class peer discussions and role plays.

- And when their organization can provide an electronic performance support system (EPSS), learners value getting "just-enough, just-in-time, just when-needed" content as a vital component of the mix.

- Finally, blended designs can provide the flexibility required by uneven technologies in remote locations, while making it easy to refresh skills and make-up for absences

13. Recommendations

Distributed Web Content management Systems has presented a general overview of typical content management system capabilities and how they can be used to benefit businesses. In the marketplace at present, there are literally hundreds of content management systems, all having different capabilities and strengths. This is the nature of a rapidly changing marketplace: while there are many very good products, there is little consistency between vendors. This research work primarily focuses on issues related to different parameters that affect the selection of most suitable CMS for an organization. There is a need to spend sufficient time to determine one's business requirements and then comprehensively evaluate the products on the market against them. By allocating sufficient time and resources for selecting the CMS, one can be confident that you have the best possible solution. This research work will analyse different factors and parameters that are helpful in selecting most appropriate CMS. This research work will include different technologies and solutions to different problems of different organizations.

14. Directions for Future Work

Content management systems will turn a common trade in coming years, as products become established, and even more solutions outspread the market. The Content Management industry will continue to mature over the next few years, to accomplish a higher level of reliability, reusability and expertise.

The good news is that the profit for organizations who deal with CMS projects in a tactical way will be higher than ever, because of the technology effectiveness of CMS systems. In the perspective of a growing e-commerce, online marketing and e-government initiatives, the demand will be greater than ever. End-users expect quality information to be presented on the web. Web activities like intranet, extranet and internet are growing more complex and the managing cost for them are increasing.

Entrepreneurs are started thinking to spend money on a Content Management System to save money for the business. To take advantage of the business opportunities offered by the Web, companies necessitate Content Management Systems that manage and deliver their Web presence with fast, accurate and easy selection.

The future Distributed Web CMS development will come up with improved technologies for

- Reuse of content
- Quick content creation and publish without any time delay
- Integration of various internal applications
- Improved corporate and client communication

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