**Interactive E-learning system with Speech Recognition of Computer Arts and Technological, Inc.**

**A Research Project**

**Presented to the Faculty of Computer Arts and Technological**

**College, Inc. Legazpi City**

**In Partial Fulfilment Of the requirement for the degree of**

**Bachelor of Science Information Technology**

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**Chapter I**

**Introduction:**

Interactive e-learning system for Computer Arts and Technological College, Inc. is a tools that can connect teachers and students online. Using this system teacher can share lessons, ideas and chat their students in order to reach out with them. The students will enroll in the particular subject that he/she has and once the student is already enrolled, the teacher can now monitor his/her students. This system will give a big help to the teacher mostly in checking exam and quizzes because the system will offer a paperless exam. Using this system, the teacher can upload their exam and quizzes and let the student to answer it base on the time assign by the teacher, after the student submit their exam the system will generate a result and the result will save automatically in the teacher’s class record.

In the early days, e-learning received a bad press, as many people thought bringing computers into the classroom would remove that human element that some learners need, but as time has progressed, technology has developed, and now we embrace smartphones and tablets in the classroom and office, as well as using a wealth of interactive designs that makes distance learning not only engaging for the users, but valuable as a lesson delivery medium.

Building partnerships with quality training providers, and combining this with a dedicated experienced technical team and support staff, Virtual College provides the perfect blended learning environment, offering anyone the chance to take their online training to the next level.

There are several benefits to e-learning whether you choose to use it on its own, or to enhance your existing in house training. By reducing the time taken away from the office, removing travel costs and doing away with printed materials, online learning helps you to save money and increase workplace productivity. It also means your staff will be happier and focused.

**Project Context:**

An Interactive E-learning System with speech recognition sounds pretty awesome right? But this project system will be develop for the teachers, students and also the registrar in the school. This system will be made, wherein the teachers and students can easily interact within or without in the school. Providing communication and educate the students using the power a technology via Internet.

My system also provides the information about the upcoming quizzes, exams and the deadline of the projects of every subjects that they are enrolled.

**Purpose and Description:**

An Interactive E-learning System with speech recognition is to determine the factors that the teachers and students having a miss lectures and hassle in giving the quizzes, exams and deadlines of the projects. This project system can easily provide the lack of time of a class.

The teachers can easily post the lectures or can conduct a live streaming lecture. Post the quizzes and exams. And also the student can upload their project in the propose project system.

**Objectives:**

The main objective of this study is to design and develop an interactive e-learning system for the teacher and students of Computer Arts and Technological College, Inc.

Specifically, the study aims to attain the following:

1. To develop a module that should adopt in order to provide an interactive e-learning system for Computer Arts and Technological College, Inc.
2. To develop a module for the registrar to add and delete an account of instructor. And also to update the status of every teachers and students.
3. To develop a module that the instructor can upload quizzes and exams. And also the answer key to correct automatically the answers of the students.
4. To develop a CMS (Content Management System) for the Admin to add and delete the information in the frontend of the system.
5. To develop and design an Electronic grading sheet that will generate the scores of every student in their quizzes and exams. This grading sheet is printable.
6. To develop a module that the teacher can conduct a lecture using a live streaming video or can upload a recorded lecture.
7. To develop a real time communication module to have a communication between the students and their teachers/instructor.
8. To develop a module that will generate a reports of the students results in the class that will be receive by the Registrar.
9. To create a Log-in page that the Admin, Registrar, Instructor and Students will have an individual account to access to specific information.

**Scope and Delimitations:**

This project system delimits the proponents in creating a web-based E-learning system for Computer Arts and Technological College, Inc.

**Scope:**

* My system which is Interactive E-learning system with Speech Recognition will be applicable only to Computer Arts and Technological College, Inc. Legazpi Campus.
* In using the webserver such as Xampp. It needs at least version 5.6.31 above. And consider the OS (Operating System) that you are using. If the Xampp is not compatible to your OS it will not run properly.
* Some of the CSS effects would not be applicable in other browsers. Use Google Chrome to achieve the standard of the system.
* In terms of adding, deleting and updating subjects in the system the Registrar is the personnel who are authorized to conduct the specific function.
* The Admin is the only one can add and delete the account of the Registrar.
* The Admin can add, delete and update the content of the website.
* The teachers/instructor can create a class group and can also drop a student in group.
* The students can check his/her scores in the exam using the Electronic grading sheet and can be print via PDF type of file.
* The Electronic grading sheet can only generate scores in quizzes and exams but the grade on the projects would not be generate.
* The type of quizzes and exams that the teachers can be upload will be a multiple choice only.

**Limitation:**

* The Admin is the one who can manage the website. He/she can Add, Update and Delete the user. The difference between the Admin and the Registrar is that the Admin can delete all users while the Registrar cannot delete the Admin. The Registrar can only delete subjects and teachers account.
* In terms of uploading images in frontend, the admin can only upload a JPEG, JPG, PNG type of images. And also for best quality and faster load of page, at least maximum of 3mb size of image and the resolution would be 1600 x 1200 pixels (W x H) in the background image.
* In using the live streaming lecture the students and instructor must have at least 2mb/s of internet speed to have a smooth discussion.
* The teachers/instructor will be the one who can drop a students in the class group.
* The teachers/instructor will be the one who can use the live streaming and the speech recognition function.
* The students cannot upload video files (mp4, avi, mkv,flv,.etc) in terms of uploading a project.
* The students and teachers can use the real-time communication module only in the class group.
* The Registrar is the one can only receive all the reports in all classes in the system.

**Project Dictionary**

* **E-learning -** E-learning describes the cognitive science principles of effective multimedia learning using electronic educational technology. Cognitive research and theory suggest that the selection of appropriate concurrent multimedia modalities may enhance learning, as may application of several other principles.
* **Speech Recognition -** Speech recognition is the ability of a machine or program to identify words and phrases in spoken language and convert them to a machine-readable format. Rudimentary speech recognition software has a limited vocabulary of words and phrases, and it may only identify these if they are spoken very clearly. More sophisticated software has the ability to accept natural speech.
* **Real Time Communication -** Real-time communications (RTC) is a term used to refer to any live telecommunications that occur without transmission delays. RTC is nearly instant with minimal latency. RTC data and messages are not stored between transmission and reception. RTC is generally a peer-to-peer, rather than broadcasting or multicasting, transmission.
* **Delete -** To remove something such as words, pictures or computer files and other information from the system.
* **Update -** Update is a software file that contains fixes for problems found by other users or the software developer. Installing an update fixes the code and prevents the problems from happening on your computer. Because updates fix problems with a program, they are almost always free and available through the program or the company’s website.
* **Add -** To insert or to put something in the system.
* **Edit** - To change or emend something in the system.
* **Login -** The act of logging in to a database, mobile device, or computer, especially a multiuser computer or a remote or networked computersystem.

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**Chapter II**

**Review of Related Literature and Systems**

**INTRODUCTION:**

The Interactive E-learning system with Speech Recognition is designed for teachers and students of Computer Arts and Technological College, Inc. to fulfil the lack of time in their class.

This chapter are those that I found important and well-connected in the development in this system that I used to solve the problems encountered in the study.

**Related Literature**

* **Hyper Text Markup Language 5 (HTML5)**

**HTML5** is a markup language used for structuring and presenting content on the World Wide Web. It is the fifth and current major version of the HTML standard. It was published in October 2014 by the World Wide Web Consortium (W3C) to improve the language with support for the latest multimedia, while keeping it both easily readable by humans and consistently understood by computers and devices such as web browsers, parsers, etc. HTML5 is intended to subsume not only HTML 4, but also XHTML 1 and DOM Level 2 HTML.

HTML5 includes detailed processing models to encourage more interoperable implementations; it extends, improves and rationalizes the markup available for documents, and introduces markup and application programming interfaces (APIs) for complex web applications. For the same reasons, HTML5 is also a candidate for cross-platform mobile applications, because it includes features designed with low-powered devices in mind.

**Tim Berners-Lee (1989)**  Tim Berners-Lee invented the World Wide Web, an Internet-based hypermedia initiative for global information sharing while at CERN, the European Particle Physics Laboratory. He wrote the first web client and server in 1990. His specifications of URIs, HTTP and HTML were refined as web technology spread.

* **Cascading Style Sheet (CSS)**

**Cascading Style Sheets** (**CSS**) is a style sheet language used for describing the presentation of a document written in a markup language. Although most often used to set the visual style of web pages and user interfaces written in HTML and XHTML, the language can be applied to any XML document, including plain XML, SVG and XUL, and is applicable to rendering in speech, or on other media. Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications.

### **Håkon Wium Lie, (1994)** described thatCSS is designed primarily to enable the separation of presentation and content, including aspects such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate .css file, and reduce complexity and repetition in the structural content.

* **Uses of CSS**

CSS is used to define styles for your web pages, including the design, layout and variations in display for different devices and screen sizes.

There are three ways to insert CSS. First the External Style Sheet With an external style sheet, you can change the look of an entire website by changing just one file!

Each page must include a reference to the external style sheet file inside the <link> element. The <link> element goes inside the <head> section. An external style sheet can be written in any text editor. The file should not contain any html tags. The style sheet file must be saved with a .css extension.

The second one is Internal Style Sheet. An internal style sheet may be used if one single page has a unique style. Internal styles are defined within the <style> element, inside the <head> section of an HTML page. An inline style may be used to apply a unique style for a single element. To use inline styles, add the style attribute to the relevant element. The style attribute can contain any CSS property.

The third one Multiple Style Sheet. If some properties have been defined for the same selector (element) in different style sheets, the value from the last read style sheet will be used.

* **PHP (recursive acronym for PHP: Hypertext Preprocessor)**

**Rasmus Lerdorf, (1994)** described that PHP is a server-side scripting language designed primarily for web development but also used as a general-purpose programming language. Originally created by Rasmus Lerdorf in 1994, the PHP reference implementation is now produced by The PHP Development Team. PHP originally stood for *Personal Home Page*, but it now stands for the recursive acronym *PHP: Hypertext Preprocessor*.

PHP code may be embedded into HTML or HTML5 markup, or it can be used in combination with various web template systems, web content management systems and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server software combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command-line interface (CLI) and can be used to implement standalone graphical applications.

The standard PHP interpreter, powered by the Zend Engine, is free software released under the PHP License. PHP has been widely ported and can be deployed on most web servers on almost every operating system and platform, free of charge.

* **AJAX**

**Ajax** (short for "asynchronous JavaScript and XML") is a set of Web development techniques using many Web technologies on the client side to create asynchronous Web applications. With Ajax, Web applications can send data to and retrieve from a server asynchronously (in the background) without interfering with the display and behavior of the existing page. By decoupling the data interchange layer from the presentation layer, Ajax allows for Web pages, and by extension Web applications, to change content dynamically without the need to reload the entire page. In practice, modern implementations commonly substitute JSON for XML due to the advantages of being native to JavaScript.

Ajax is not a single technology, but rather a group of technologies. HTML and CSS can be used in combination to mark up and style information. The DOM is accessed with JavaScript to dynamically display – and allow the user to interact with – the information presented. JavaScript and the XMLHttpRequest object provide a method for exchanging data asynchronously between browser and server to avoid full page reloads.

* **JavaScript (JS)**

It is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. While JavaScript is influenced by [Java](https://techterms.com/definition/java), the [syntax](https://techterms.com/definition/syntax) is more similar to [C](https://techterms.com/definition/cplusplus) and is based on ECMAScript, a scripting language developed by Sun Microsystems.

**Brendan Eich, (1995)** described that JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server. This means JavaScript [functions](https://techterms.com/definition/function)can run after a webpage has loaded without communicating with the server. For example, a JavaScript function may check a web form before it is submitted to make sure all the required [fields](https://techterms.com/definition/field) have been filled out. The JavaScript code can produce an error message before any information is actually transmitted to the server.

* **Bootstrap**

Bootstrap is a free and open source front end development framework for the creation of websites and web apps. The Bootstrap framework is built on HTML, CSS, and JavaScript (JS) to facilitate the development of responsive, mobile-first sites and apps.

Responsive design makes it possible for a web page or app to detect the visitor’s screen size and orientation and automatically adapt the display accordingly; the mobile first approach assumes that smartphones, tablets and task-specific mobile apps are employees' primary tools for getting work done and addresses the requirements of those technologies in design.

Bootstrap includes user interface components, layouts and JS tools along with the framework for implementation. The software is available precompiled or as source code.

**Mark Otto and Jacob Thornton** developed Bootstrap at Twitter as a means of improving the consistency of tools used on the site and reducing maintenance. The software was formerly known as Twitter Blueprint and is sometimes referred to as Twitter Bootstrap.

In computers, the word bootstrap means to [boot](http://searchwinit.techtarget.com/definition/boot): to load a program into a computer using a much smaller initial program to load in the desired program (which is usually an operating system).

In the physical world, a bootstrap is a small strap or loop at the back of a leather boot that enables you to pull the entire boot on and in general usage, bootstrapping is the leveraging of a small initial effort into something larger and more significant. There is also a common expression, "pulling yourself up by your own bootstraps," meaning to leverage yourself to success from a small beginning.

* **Codeigniter**

**CodeIgniter** is an open-source software rapid development web framework, for use in building dynamic web sites with PHP. CodeIgniter is loosely based on the popular model–view–controller (MVC) development pattern. While controller classes are a necessary part of development under CodeIgniter, models and views are optional. Codeigniter can be also modified to use Hierarchical Model View Controller (HMVC) which allows developers to maintain modular grouping of Controller, Models and View arranged in a sub-directory format.

CodeIgniter is most often noted for its speed when compared to other PHP frameworks. In a critical take on PHP frameworks in general, PHP creator Rasmus Lerdorf spoke at frOSCon in August 2008, noting that he liked CodeIgniter "*because it is faster, lighter and the least like a framework.*"

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* **PhpStorm**

Is a commercial, cross-platform IDE for PHP built on JetBrains' IntelliJ IDEA platform.

PhpStorm provides an editor for PHP, HTML and JavaScript with on-the-fly code analysis, error prevention and automated refactorings for PHP and JavaScript code. PhpStorm's code completion supports PHP 5.3, 5.4, 5.5, 5.6 & 7.0 (modern and legacy projects), including generators, coroutines, the finally keyword, list in foreach, namespaces, closures, traits and short array syntax. It includes a full-fledged SQL editor with editable query results.

PhpStorm is built on IntelliJ IDEA, which is written in Java. Users can extend the IDE by installing plugins created for the IntelliJ Platform or write their own plugins.

All features available in WebStorm are included in PhpStorm, which adds support for PHP and databases. WebStorm ships with pre-installed JavaScript plugins (such as for Node.js), which are available for PhpStorm as well at no cost.

* **Xampp**

XAMPP is an open-source web server package that works on various platforms. It is actually an acronym with X meaning “cross” platform, A for Apache HTTP server, M for MySQL, P for PHP, and P for Perl. XAMPP was designed to help webpage developers, programmers, and designers check and review their work using their computers even without connection to the web or internet. So, basically XAMPP may be used to stand as pages for the internet even without connection to it. It can also be used to create and configure with databases written in MySQL and/or SQLite. And since XAMPP is designed as a cross-platform server package, it is available for a variety of operating systems and platforms like Microsoft Windows, Mac OS X, Linux, and Solaris.

* **Database Management System(DBMS)**

It is a computer-software application that interacts with end-users, other applications, and the database itself to capture and analyze data. A general-purpose DBMS allows the definition, creation, querying, update, and administration of databases. Well-known DBMSs include MySQL, PostgreSQL, MongoDB, MariaDB, Microsoft SQL Server, Oracle, Sybase, SAP HANA, MemSQL, SQLite and IBM DB2.

A database is not generally portable across different DBMSs, but different DBMSs can interoperate by using standards such as SQL and ODBC or JDBC to allow a single application to work with more than one DBMS. Computer scientists may classify database-management systems according to the database models that they support; the most popular database systems since the 1980s have all supported the relational model - generally associated with the SQL language. Sometimes a DBMS is loosely referred to as a "database".

* **MySQL**

MySQL is a freely available open source Relational Database Management System (RDBMS) that uses Structured Query Language (SQL). SQL is the most popular language for adding, accessing and managing content in a database. It is most noted for its quick processing, proven reliability, ease and flexibility of use. MySQL is an essential part of almost every open source PHP application. Good examples for PHP/MySQrL-based scripts are phpBB, osCommerce and Joomla.

**Michael Widenius (1995)** described thatMySQL is written in C and C++. Its SQL parser is written in yacc, but it uses a home-brewed lexical analyzer. MySQL works on many system platforms, including AIX, BSDi, FreeBSD, HP-UX, eComStation, i5/OS, IRIX, Linux, macOS, Microsoft Windows, NetBSD, Novell NetWare, OpenBSD, OpenSolaris, OS/2 Warp, QNX, Oracle Solaris, Symbian, SunOS, SCO OpenServer, SCO UnixWare, Sanos and Tru64. A port of MySQL to OpenVMS also exists.

**Related System**

* **Khan Academy**

Khan Academy doesn't get top billing due to its popularity. Sal Khan and his team have earned their place by creating self-paced, free, source of online education that has become an industry standard. Khan academy provides an easy path for students to jump in and begin learning about any subject that they choose.

Khan Academy certainly has youth appeal with its avatars and ability to earn badges, but it is also an extremely viable option for adults wanting to improve their technical skills, or learn about subjects such as entrepreneurship.

* **Coursera**

Coursera has partnered with museums, universities, and other institutions to offer students free classes on an astounding variety of topics. Students can browse the list of available topics or simply answer the question "What would you like to learn about?", then when they answer that question they are led to a list of available courses on that topic. Students who are nervous about getting in over their heads can relax.

Coursera provides plenty of information about each class. This includes:

* A course syllabus.
* Course format.
* Recommended background and experience.
* Materials needed.
* Course at a glance information.
* Students who finish a course may often receive a statement of accomplishment from the instructor.
* **W3 Schools**

We Schools is a free eLearning website that is dedicated to teaching students the various aspects of web design. Students select what they want to learn from a variety of choices including:

* HTML.
* PHP.
* SQL.
* Jquery.
* More.

For each concept that students wish to master, they go through a variety of online tutorials, take tests, and ultimately complete each course. Students can take a final test to prove their mastery, and if they pay an extra fee receive a certificate of completion.

* **Codecademy**

One of the most exciting developments in the tech world is the number of people who are learning to write code. Codecademy allows students to select their goal/learning objective and then recommends the proper course for that student.

Codecademy works because it makes coding accessible to any interested student, provides practical recommendations for students who want to learn how to code but don't understand how these new skill might apply to their current job.

* **Edmodo**

**Edmodo** is an educational technology company offering a communication, collaboration, and coaching platform to K-12 schools and teachers. The Edmodo network enables teachers to share content, distribute quizzes, assignments, and manage communication with students, colleagues, and parents. Edmodo is very teacher-centric in their design and philosophy: students and parents can only join Edmodo if invited to do so by a teacher. Teachers and students spend large amounts of time on the platform, both in and out of the classroom.

On May 17, 2017, Edmodo sent an email informing users that it was the victim of a major hack of user information. Some 77 million users' data were breached: this included the username, hashed password and email address (in a subset of the cases, since not all users need an email address to register). Since passwords were both hashed and salted (encrypted) using the bcrypt algorithm the effort to decrypt all the passwords would have been very large. There were no reports of any school data being affected, nor any identities compromised, according to an external audit commissioned by the company.

In June 2017, Edmodo announced Askmo, an educational video search engine, as an illustration of the benefits of machine learning on educational data sets: the search is based on videos that had been shared by teachers in the context of educational discussions and can be filtered by subject and grade level.

**Synthesis of the State of the Arts:**

This is similar with the Edmodo wherein it is similar to the fact that they are all concerned in the teaching and tutorial procedure of the students. To have an undemanding and effortless teaching technique. And have a conveyance between the students and teachers to deliver a good education and well interactive learning system.

**Gab Bridge by the Study:**

The challenge of integrating all the strength and weak points of the literatures mentioned above into one system is huge but achievable. The system and the literature presented above certainly supports the value of e-learning. However, it was used in a different disciplined or the analysis was applied more on customer data. There are many deficiency in the above study. The systems above are similarly in terms but different in the content. One of the difference is the uploading of quizzes and exams. And the live streaming in lecturing the students. These insights are the part that the study attempts to bridge.

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**Chapter III**

**Introduction:**

The system entitled the “Interactive E-learning System with Speech Recognition of Computer Arts and Technological College, Inc.”. This system will benefit the teachers, students as well as the staff of the school. This customize system has the capability to assist the stakeholders in their needs.

**The System:**

An Interactive E-learning System with Speech Recognition of Computer Arts and Technological College, Inc. is designed with functionality and most of all accessibility, user friendliness and ease of use. This will allow the users to have an easy and interactive learning system. The website design was made possible using PHP as the main programming language for the structure and linked CSS (Cascading Style Sheet) for website looks. The design was made possible using HTML (HyperText Markup Language). This combination of CSS and HTML will make the website captivating. PHP (PHP: Hypertext Preprocessor), is a widely used general purpose scripting language that is especially suited for Web development and can be embedded in HTML. The Interactive E-learning System with Speech Recognition of Computer Arts and Technological College, Inc. can be manage using CMS.

A **Content Management System** (**CMS**) is a computer application that supports the creation and modification of digital content. It is often used to support multiple users working in a collaborative environment.

CMS features vary widely. Most CMSs include Web-based publishing, format management, history editing and version control, indexing, search, and retrieval. By their nature, content management systems support the separation of content and presentation.

A web content management system (WCM or WCMS) is a CMS designed to support the management of the content of Web pages. Most popular CMSs are also WCMSs. Web content includes text and embedded graphics, photos, video, audio, maps, and program code (e.g., for applications) that displays content or interacts with the user.

Such a content management system (CMS) typically has two major components:

A content management application (CMA) is the front-end user interface that allows a user, even with limited expertise, to add, modify, and remove content from a website without the intervention of a webmaster. A content delivery application (CDA) compiles that information and updates the website.

Digital asset management systems are another type of CMS. They manage things such as documents, movies, pictures, phone numbers, and scientific data. CMSs can also be used for storing, controlling, revising, and publishing documentation.

**Methodology:**

* **RAD model**

**Rapid application development** (**RAD**) is both a general term used to refer to alternatives to the conventional waterfall model of software development as well as the name for James Martin's approach to rapid development. In general, RAD approaches to software development put less emphasis on planning and more emphasis on process. In contrast to the waterfall model, which calls for rigorously defined specification to be established prior to entering the development phase, RAD approaches emphasize adaptability and the necessity of adjusting requirements in response to knowledge gained as the project progresses. Prototypes are often used in addition to or sometimes even in place of design specifications.

RAD is especially well suited for (although not limited to) developing software that is driven by user interface requirements. Graphical user interface builders are often called rapid application development tools. Other approaches to rapid development include Agile methods and the spiral model.

The James Martin approach to **RAD divides the process into four distinct phases**:

1. **Requirements planning phase** – combines elements of the system planning and systems analysis phases of the Systems Development Life Cycle (SDLC). Users, managers, and IT staff members discuss and agree on business needs, project scope, constraints, and system requirements. It ends when the team agrees on the key issues and obtains management authorization to continue.
2. **User design phase** – during this phase, users interact with systems analysts and develop models and prototypes that represent all system processes, inputs, and outputs. The RAD groups or subgroups typically use a combination of Joint Application Development (JAD) techniques and CASE tools to translate user needs into working models. *User Design* is a continuous interactive process that allows users to understand, modify, and eventually approve a working model of the system that meets their needs.
3. **Construction phase** – focuses on program and application development task similar to the SDLC. In RAD, however, users continue to participate and can still suggest changes or improvements as actual screens or reports are developed. Its tasks are programming and application development, coding, unit-integration and system testing.
4. **Cutover phase** – resembles the final tasks in the SDLC implementation phase, including data conversion, testing, changeover to the new system, and user training. Compared with traditional methods, the entire process is compressed. As a result, the new system is built, delivered, and placed in operation much sooner.

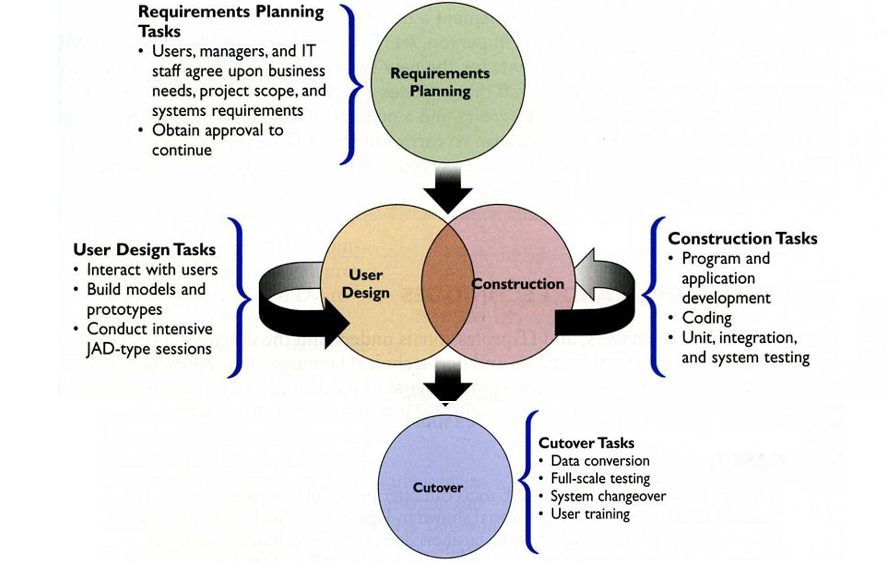
**RAD Advantages:**

* Reduced development time.
* Increases reusability of components
* Quick initial reviews occur
* Encourages customer feedback
* Integration from very beginning solves a lot of integration issues.

**RAD Disadvantages:**

* Depends on strong team and individual performances for identifying business requirements.
* Only system that can be modularized can be built using RAD
* Requires highly skilled developers/designers.
* High dependency on modeling skills
* Inapplicable to cheaper projects as cost of modeling and automated code generation is very high.

**When to use the RAD model?**

* RAD should be used when there is a need to create a system that can be modularized in 2-3 months of time.
* It should be used if there’s high availability of designers for modeling and the budget is high enough to afford their cost along with the cost of automated code generating tools.
* RAD SDLC model should be chosen only if resources with high business knowledge are available and there is a need to produce the system in a short span of time (2-3 months).
* Administrator will register in the system.
* Administrator will login in the system
* Administrator will manage the content of the website. He/she who will input the images, information and anything that will complete the design of the frontend.
* Administrator will add the account of the Registrar.
* Registrar will login the account that the Admin provided.
* Registrar will add and delete the course that will be available in the system.
* Registrar will add and delete the account of every instructors.
* Registrar will receive the reports of the instructors of the result of the quizzes and exams of the students.
* Instructor will login the account that the Registrar provided.
* Instructor will create a class group that he/she will be manage. This class group is class that the student will enroll.
* Instructor will upload learning materials that will be downloaded or can be view by the students.
* Instructor will give the students a quizzes, exams and projects that they will be taken.
* Instructor will view the results of the quizzes, exams and check the projects.
* Students will register in the class group. Using the subject code/class group code that the instructor will provide.
* Students will login in the system.
* Students will take the quizzes, exams and upload their projects.
* Students will get the results of their quizzes and exams.

**Stakeholders:**

* **Administrator**
* Only the admin can manage the content of the website.
* Admin can delete the instructor and students account.
* **Registrar**
* The Registrar is the only one who can add and delete instructor in the system.
* He/she can add and delete a subjects.
* In the system registrar can monitor the status of teachers and students.
* **Teacher/Instructor**
* The instructor can create a class group for every subject he/she handling.
* He/she can upload quizzes, exams and projects.
* The instructor can set a deadline for the project. If the set time reach the end. It will automatically disable the submission platform.
* Upload learning materials and recorded video tutorial.
* Set a live streaming lecture with a speech recognition.
* **Students**
* The student will register an account. And to enroll in a subject the instructor will provide the code subject to the student to be enroll.
* The student can take a quizzes, exams and submit projects given by their instructor.
* Students will be notify if there is an upcoming quizzes, exams or projects deadlines.
* Students can monitor the scores of the quizzes and exams through the Electronic Grading Sheet.

**Technical Resources**

**Hardware:**

* CPU/Processor (Intel Dual Core or higher)
* 1gb RAM
* 10gb HDD space
* Internet connection (at least 2 mbps)

**Software:**

* Browser (Mozilla Firefox, Google Chrome, IE v. 9 or higher, Safari)
* Operating System (Windows 7,8,8.1,10, OS X 10 or higher)
* Xampp 5.6.30 or higher version.

**Reference:**

**“CMS”** Retrieved from google.com in World Wide Webhttps://en.wikipedia.org/wiki/Content\_management\_system

**“RAD”** Retrieved from google.com in World Wide Webhttps://en.wikipedia.org/wiki/Rapid\_application\_development