**CHAPTER III**

**RESEARCH METHODOLOGY**

This section presents the methodology that will be utilized for the study and other technical specifications that will help to strengthen the proposal. It also covers diagrams, designs, features, techniques and the materials to implement iLearnCentral: a cloud-based learning center platform with mobile technology that will meet the requirement of objectives of the study.

**Software Engineering Methodology**

The development study of iLearnCentral will use the agile methodology as the software engineering project method. Agile software development describes an approach to software development beneath which necessities and solutions advance through the collaborative exertion of self-organizing cross-functional groups.

One of the benefits of the agile methodology that fits this study is the collaboration, and open communications for the developers, advisers, and partners based on their suggestions and any modifications arise throughout the development. It advocates versatile planning, developmental improvement, first conveyance, and continuous change, and it empowers fast and adaptable reaction to change.



Figure 2: **Agile Development Methodology**

Figure 2 (Cryptex Technologies Pvt Ltd, 2016), demonstrates the framework lifecycle in an agile development methodology. Agile approaches are typically used in software development to help businesses respond to unpredictability. This methodology provides opportunities to assess the direction throughout the development lifecycle. This is accomplished through standard flows of work, known as sprints or cycles, toward the finish of which groups must present a potentially transmittable product increment. This methodology focuses the team on the repetition of abbreviated work cycles as well as the functional product yield; agile methodology is described as iterative and incremental.

The developers did the following phases of the Agile Methodology:

**Requirement Analysis.** Define the requirements for the iteration based on the product backlog, sprint backlog, customer and stakeholder feedback.

For this section the features of the system are gathered by doing research, interviews with experts in the industry specifically in the related fields. The UI designer and the programmer will identify the software requirements needed for the system to fulfill the features. The technical writer will take note of the changes made. The technical writer will then validate this with all the team members. The database designer will then verify with the materials if the features are compatible. The project manager will report to the team’s adviser about the adjustments made by the team.

For the next iterations, the team members assigned to work on the blockers will analyze the problem and come up with a possible solution. They will consult with the other members for possible solutions. The team members will make a report on their progress at the end of each day.

**Plan Phase.** Planning phase involves creating a set of plans that helped in guiding the team through the execution and closure phases of the project. The plans created during this phase helped the developers to manage time, cost, quality, change, risk, and issues to ensure that the developers delivered the project on time and within budget.

**Design Phase.** In the designing phase, the requirements that the developers had analyzed and identified were used to make design choices using various diagrams. The UI designer will design the screen layouts for the user interface. The programmer and database designer will define the interfacing mechanism for the system components. The project manager will check on the progress of the tasks of the members. In this phase, the researchers will identify the different hardware used for the project.

**Development Phase.**In this phase, all aspects of the product will be tested for functionality and performance. The product will be verified if it contains all the requirements laid out in the requirements analysis and if it accurately processes the data.

The developers tested the program, process it, then recognized the issues and revised or changed the issues that fall outside of set up measures or necessities. Hardware components are tested also independently and physically to guarantee that it has the capacity to build the necessary information integrated in the mobile application for the notice of the end clients. Each part of the activity experienced a progression of individual testing through various testing techniques to guarantee its effectivity and productivity before deployment.

**Release.** Before releasing it out to the market, developers did several activities on testing the device and the application so that it passes through the required process. This involves requirements for the system to operate with tolerable performance and precise processes within each activity of the deployment process. After that, developers installed the application into the client environment with the help of guidelines provided in the deployment document.

**Track and Monitor.** In this phase, after the system has been sent out to the customers/clients. The developers keep track, monitor and provide IT support services to include improvement and upgrade of the device and application if necessary.

**Planning/Conception-Initiation Phase**

In this section, high-level decisions are made regarding why a project is needed, whether or not it can be done, and what is needed.This helped the researchers to keep track of their assigned tasks in fulfilling the specified time, the progress of each requirement and task, and the budget with project work plans.

**Business Model Canvas**

The Business Model Canvas is a visual representation of current or new business models,

generally used by strategic managers.

**Table 2**

BUSINESS MODEL CANVAS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Key Partners** | **Key Activities** | **Value Proposition** | | **Relationships** | **Customer Segment** |
| -Learning centers administration  -Educators currently teaching in learning centers  -Job seeking educators | -Design and develop an intelligent school management software geared towards the needs of learning centers, educators, students | - System can be used by any type of learning center  - System could automate basic operations of administration with integrated artificial intelligence  - System has additionalsupport to the educators and students | | - Customer service hotlines  - User Feedback  - Email | - Learning center administration  - Educators in learning centers  - Students in learning centers  - Educators seeking employment |
| **Key Resources** | **Channels** |
| - Web domain and host  - Developers  - UI/UX designers  - Researchers | - Visits to Establishments  - Company Website  - Social Media Marketing  -Word of mouth |
| **Cost Structures** | | | **Revenue Streams** | | |
| - Customer acquisition costs  - Hosting  - Research and Development  - Marketing and Advertising  - Operations and Maintenance | | | - Subsciption based on feature packages  - Ad Revenue from free or trial users | | |

Table 2 illustrates the system’s Business Model Canvass. The Business Model Canvass is essential in building a successful business market. This will give the researchers concrete ideas about the system’s target market and the cost in developing it. Value propositions will illustrate the necessity of the system and show its value to the community. Channels are a way for the team to market the system at the same time to communicate with buyers and investors. Customer relations will make sure we maintain our business relationship will the entities involved and Revenue streams show how we can gain income from the products and services offered.

**Program Workflow**

A program workflow is to define, control, automate and improve business processes. Progressions of steps (tasks, events, interactions) that comprise a work process, involve two or more persons, and create or add value to the organization's activities.

**Validation Board (Stages 1 and 2)**

Table 3 shows the different problems that our customers encountered. It also shows the solution that the researcher will use to solve the problem. Table 3 also contains the riskiest assumption, the methods and success Criteria, also the reuslts and decision and also the learning.

**Gantt Chart / PERT Chart**

This section presents a Gantt chart that demonstrates the measure of work done or activities that were completed in specific timeframes in relation to the amount planned for the specified periods. The completion of each activity is represented in three different colors: red means the activity is still incomplete, yellow means the activity is still on the process, and green means the activity is already complete. This chart serves as a basis for the proponents to assess how long a project should take, determine the resources needed, and plan the order in which the researchers’ complete tasks.

**Functional Decomposition Diagram**

This section shows the functional relationship of the different components of the project decomposed into important modules in order to clearly illustrate and simplify different activities. The tasks in turn are broken down into simpler details.

**Analysis / Design Phase**

The analysis phase covers the definition of requirements that are needed for the system to be accomplished. This phase defines the problem that the customer is trying to solve.

**Use Case Diagram**

Use case diagram exhibits the graphic representation of the R’s-Earn process and

possible sequences of interactions between systems and users in a particular environment and related to a particular goal

**Storyboard**

**User Interface Diagram**

**Database Design**

This section exhibits the relationship of every table through its key information. Each database design table has corresponding keys which will be used to retrieve the contents of the tables. In relational databases‟ environment, primary key is a unique identifier, and cannot contain a null value. Foreign key, or the secondary key, is often a primary key of another table which links a table to another table.

**Entity-Relationship Diagram**

This section shows the relationship of entities involved in iLearnCentral. Each relationship is represented by arrows.

**Data Dictionary**

This section describes the data types, properties, and size of the fields in the tables shown in the previous section.

**Network Model**

The network model shows how the components of the system communicates through the internet. The diagram shows the user can check and monitor their account for possible breach or errors through application.

**Network Topology**

The network topology shows how both the hardware and the software part of the system works together with the use of internet connection to access the database for the user’s access.

**Development/Construction/Build Phase**

The Development Phase marks the end of the initial section of the process and signifies the start of production. The purpose of this phase is to convert the system design prototyped in the Design Phase into a working system that addresses all documented system requirements. To complete this phase successfully, two elements are required: 1) a complete set of design specifications and 2) proper processes, standards, and tools.

**Technology Stack Diagram**

**Software Specification**

**Program Specifications**

Program specifications contain the list of algorithms needed for the system.

**REFERENCES**