
ABSTRACT

During the past several years, the design field has been witnessing tremendous developments. Both software and hardware features of computers and Information Technology (IT) are exploited in 'product design' field. Particularly, several 'Computer Aided Design' (CAD) models have been under use by the product designers. However there is very little evidence that the practitioners have adopted these CAD models for enhancing agility in organizational arena. This situation reveals the need of a model to facilitate the use of CAD features for imparting agility in organizations. Agility refers to the capability of an organization to produce any type of product, process and service demanded by the customer in any volume, in a shorter span of time without compromising on quality and cost. In order to fulfil this need, during the conduct of research being reported in this work, a model called Agile design system with extreme programming methodology. This work analyzes this combination architecture for online training courses such as C, C++ and JAVA with respect to approaches and agile methods using Extreme programming. This work proposed the agile technique development process as an iterative method based on collaboration.

KEYWORDS: Software Engineering, E-Learning, Web application, Agile, Testing.

INTRODUCTION

Agility, is clearly the core of agile development it identifies or tell the way in which agile team should communicate and respond to requirement changes. Researchers [1][2] describes about software development agility "during project life cycle the software program team have an efficient capable for incorporate user requirement changes"[4]. Qumer and Henderson-Sellers [3] describes that agility have a very flexible for accommodate expected or unexpected changes. It can be clear from these definitions that agile team members communicate efficiently and effectively. Nowadays [5][6], this world is focusing on computerizing all manual process. In such situation [7] developing an application has grown to be vital. By definition software engineering would be the application of a systematic, quantifiable and disciplined strategy to the development, [8] operation, and maintenance of software by which an engineering discipline is concerned along with aspects of software production. So to develop an application with engineering discipline various software development models were identified and developed. All were success with their aspects. Situation has changed today, largely because the applications have become obsolete sooner and user requirement are changing frequently within this electronic world. To meet this drastic situation, agile methodology is developed [9].

Agile are developed to include any of changes in the requirement while application has entered the any of development phases. For developing online course training application, agile methodology is choose [10]. This development stages includes a phases like requirement gathering, design, development and testing. In requirement gathering phase, users have to select the language needed for the development of application. The selection will be among C, C++ and java. Once language is chosen, the requirement form is displayed to collect the user requirements. For each requirement, a set of one or more design elements will be produced. A design element describe the desired system features in detail, and includes functional hierarchy diagrams, screen layout diagrams, tables, process diagrams, pseudo-code, and entity-relationship diagram. These design elements are intended to

explain the system sufficiently. Once the flow of application is framed, development phase can be commenced. The development process involves the implementation of design component. Implementation is done on the choice selected by user. After development, testing is done to ensure the requirement is implemented as a system. Since the application is developed using agile methodology, it shows better performance than the previously implemented system.

EXTREME PROGRAMMING

Extreme Programming (XP) [11-14] has evolved from traditional Software Development models which make the long development time frames. XP is organized around short iterations. The phases that may be engaged with the Extreme Programming are, Exploration phase, Planning, Iteration to Release, Productionizing, Maintenance and Death phase. Among the Exploration Phase, the clients prepare the buyer story/story card that they would like to be covered in the initial release. An individual story has a set of sentences which the end user wishes to achieve. Planning Phase sets the main purpose order for such stories, and an agreement located on the content of the initial release.

The programmers estimate simply how much effort each story requires and accordingly allow the schedule. Iteration to Release phase includes several iterations of a given system just before the very first release. The scheduled set might be split into a number of iterations in Iteration and Release phase. Within the Productionizing phase, new changes might still be made and decision ought to be gotten whether or not they are going to be covered in the present release. Next is maintenance phase which can require recruiting new persons directly into team. During the past phase, viz., Death phase, no new stories have to be implemented [15][16].

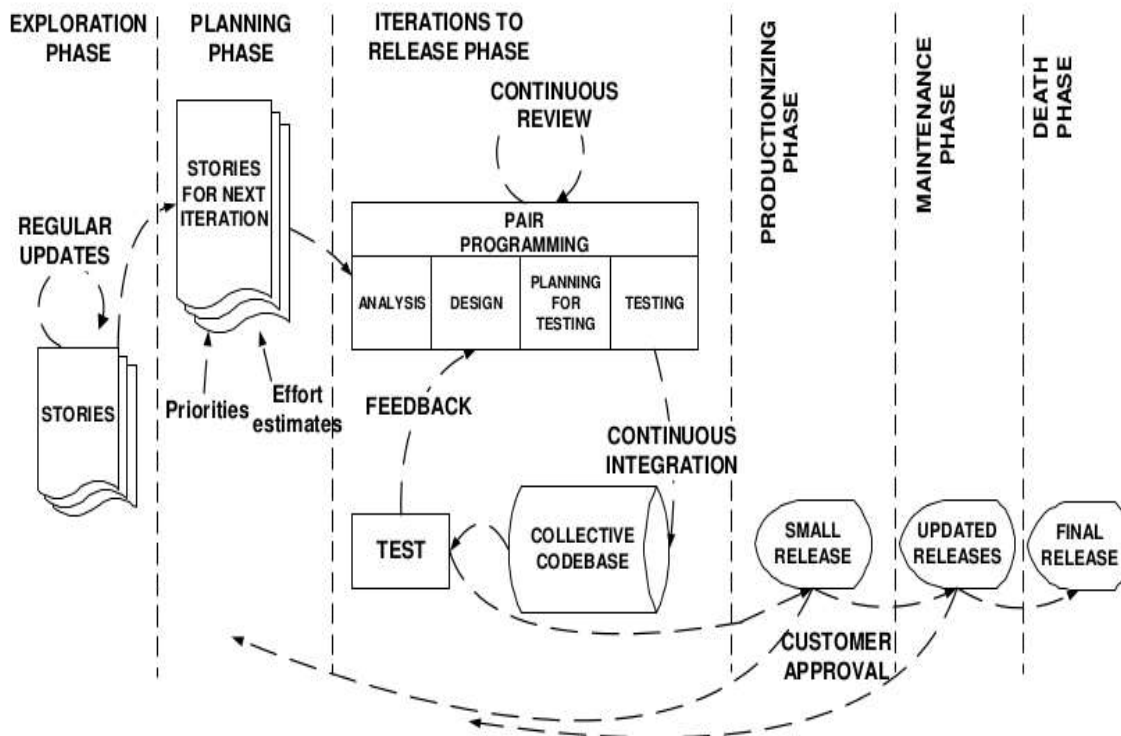


Figure 1. Life Cycle of XP Process

Limitations

- XP is certainly not well suited for large, difficult or complex projects.
- It needs great amount of coordination amongst the programmers during the course of pair.
- Programming as well as small conflict may damage the purpose of collective code ownership and thus impact the iterations. Development of ‘metaphor’ is essential to get shared within team carefully to make sure of the.
- Common understanding of the terminology. Pair programming is basically a noteworthy practice in XP; wherein two developers work for the.
- Same machine at the same time and thus it cannot be applied projects exclusively with only one developer. Ever since the testing and coding is completed from the same developer, all of the probable problems is probably not labeled as developers test beginning with the same insight the software program is generated.

MATERIALS AND METHODS

The proposed framework is implemented for online training course for C, C++ and JAVA using agile software. Agile development has attracted huge interest beginning with the software industry. The purpose of agile methodology is pretty simple which delivers excellent quality products and promotes collaboration through an incremental process, Agile is intended to advertise transparency within a development process, respond quickly to inevitable modification doing business requirements. The development team is prepared for iterative modification and to discover the requirement collection process must reflect this reality. The capital aim of the work.

- To recognize various knowledge management practices specific to agile software development
- To identify knowledge sharing strategies in distributed agile teams in Indian software development organization
- To discover the parameters for your upcoming applicability of agile software development in distributed environments in Indian software development organization.
- To propose guidelines for knowledge sharing in distributed agile software development.
- To develop an web application for providing online program training for further information flow among team members

The proposed model contains the following phases.

- Requirement Gathering
- Design
- Developing
- Testing

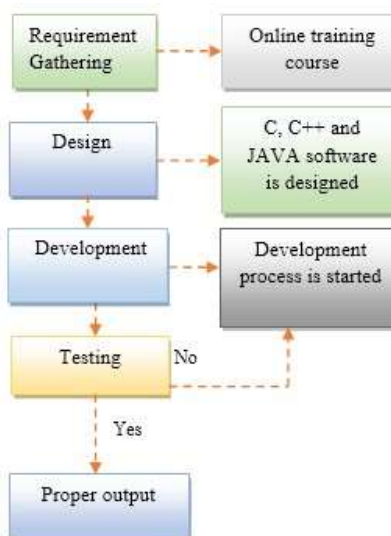


Fig 2. Proposed framework of agile approach in Web Application Development

Requirement Gathering:

The initial stage of the proposed work is Requirement gathering, where the requirement is collected from the client and the planning procedure of application development is performed. The proposed work is to develop web application for providing the online training for technical languages such as C, C++, and Java. To do so the basic requirement has to be collected, such as

- What does the client company do?
- Description about the course detail
- What are the technical languages that can be trained?
- How big will the client website be?
- How do the clients plan to keep their website updated?

The above questions are some example requirements for this proposed approach. Based on the requirements the initial planning procedure is designed to proceed the further development process. The upcoming level describes the detail about the design of the web application.

Design

The initial design procedure is made based on the collected requirement in the first stage. The further design will be done by the design patterns which offer the best methods for your object-oriented software developers. The issues confronted by the software developers during the software development can be solved by Design patterns. In this approach two design patterns are taken for designing such as factory pattern and singleton pattern. These patterns are discussed in detail in the following section.

Singleton pattern: It is the simple design pattern which comes under creational pattern. This module gives the best way for object creation and access. This allows accessing the object directly without the need to instantiate it. This pattern includes a single class responsible for creating an object while making sure that only a single object gets created.

Factory pattern: Factory pattern is one of the most important design patterns used in Java which provides a way to create an object and falls under creational pattern as that pattern provides one of the most effective ways to develop an object. In this module an object can be created without exposing the creation logic to the client that refers to newly created objects using a common interface.

Development: The proposed web application is developed using the NetBeans IDE with J2EE Enterprise. The web pages such as register, login, course trading portal, student detail pages can be designed using the JSP pages. The database maintenance is handled by MySQL 5.1. The connection between the web pages and the database can be established using the servlet controller.

Java Server Page (JSP):

JSP technology controls the content (appearance) of Web pages through servlet controller. JSP has several features in developing the web pages. Sun Microsystems refers to the JSP technology as the Servlet API. JSP is a Java program executed by the Web server such as GlassFish, Tomcat, and is an Active Server Page that contains a script that is interpreted by the script interpreter just before the page is shipped to the user.

Servlet: A servlet program is the controller in the MVC framework that runs on a server. It is used to extend the server capabilities which host applications. Servlet can respond to any type of request, for some applications, Servlet defines the HTTP-specific servlet classes. In order to write the servlet program `javax.servlet` and `javax.servlet.http` packages can be used that provide interfaces and classes of servlets.

MySQL: MySQL is an open source RDBMS used in this proposed approach to maintain the background process. MySQL 5.1 is utilized here to store the student detail and the course details etc. MySQL is a popular database for use in web applications,

With the above mentioned component the proposed web application is developed and the following section describes the testing phase.

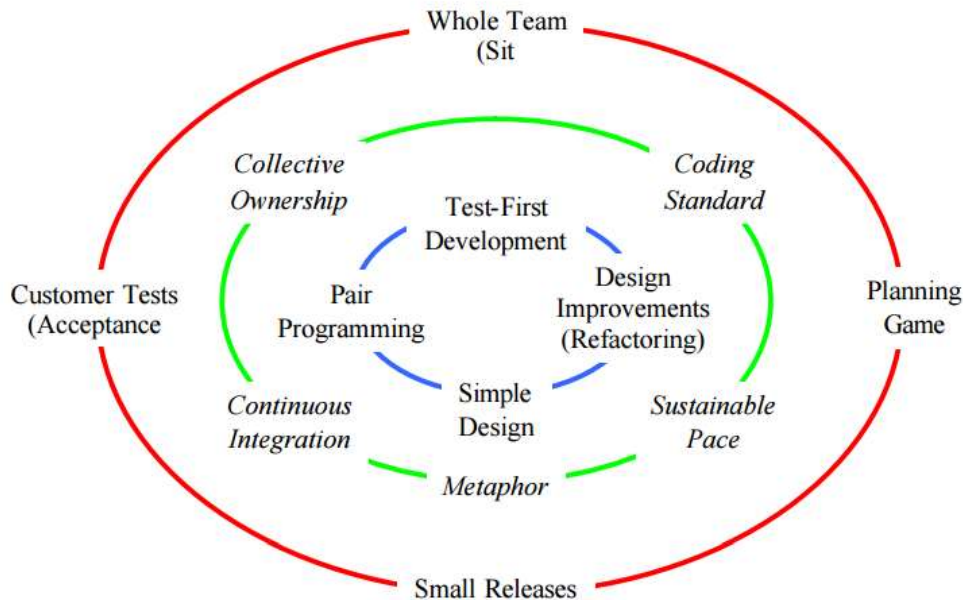


Figure 3. XP Practices and the Circle of Life

Whole Team

The contributors of XP project developers sit together, as members in a single group. This crew need to consist of an enterprise representative "customer" who offers the requirements, sets the priorities, and steers the assignment. It's sensible whilst the client or in reality one among his/her aides is largely a real end consumer who is aware of the domain knowledge and what is wished. The crew will of route have programmers. The crew will probably consist of testers, who help the patron define the client requirements. Analysts might also serve as helpers closer to the consumer, supporting to represent the requirements. There could be not unusual coach, who assists the crew persist in tune, and helps the developers how to approach and a manager for offering capital, supervision of external conversation, and coordination deeds. A number of the roles not anything is always for the exclusive assets of most effective one individual. Each person on an XP team contributes in any factor as they can. The maximum beneficial groups do not have any experts, only preferred participants with unique skills.

Planning Game XP

For software development categories two types key question for determining the Planning session: one is predicting what is probably carried out thru due date and the alternative is determining what have to be carried out subsequent.

- Straightforward: emphasis covers steering the assignment.
- Difficult : simply on genuine prediction of what will be wished and the way long it typically takes

There are more than one key making plans steps in XP, addressing each of those questions:

- Release Planning is basically a practice in which the consumer offers the required capabilities into the programmers, and to find out the programmers estimate their issue.
- The usage of the costs estimates in hand, with familiarity in the importance of 1's features, the patron lays out and define concerning the assignment. Initial release of plans is always obscure: neither the priorities nor the estimates are correctly company, and till crew starts off evolved to perform, we're surely not able to know simply how fast they seem to also cross.
- Even the first release plan is accurate just enough for selection making, however, and XP teams revise a release plan regularly [17].

Iteration Planning

Team define direction every couple of weeks for the practice of following the iteration planning in XP. Normally, Iteration planning in XP takes two week "iterations" for delivering the software at the end of all iteration. During Iteration Planning, the Customer presents the basic features desired for the imminent couple of weeks. The programmers break them down into tasks, and estimate their cost (at the finer grade of detail than in Release Planning). Consistent with the amount of work carried out in the prior iteration, the team subscribes what might be undertaken within the present day new release. These making plans steps are extremely easy, but they provide clearly suitable statistics and tremendous steering are under the control of a given Customer. Each couple of weeks, the quantity of progress is entirely visible. Then again, if the development is so seen, regardless of the truth that the capability to determine what might be carried out subsequent is taken into consideration to be completed, that type of XP tasks have a tendency to deliver even extra of what is wanted with much less strain and stress.[18].

Customer Tests

To be a part of offering every preferred feature, the XP customer defines some of computerized acceptance tests to point out the fact that the characteristic is functioning. The team builds these tests and makes use of them into show to themselves, and also to the customers, which the characteristic is carried out efficiently. Automation is massive because in the press of manual assessments, valuable time, are skipped. That can like turning off your lights every time the night gets darkest. An excellent XP groups deal with their client checks inside one comparable way they simply do programmer exams: after the test runs, the team maintains it jogging correctly thereafter. Which means the inner gadget simplest improves, continually notching ahead, never backsliding.

Small Releases

XP teams exercise small releases in two crucial ways:

Primarily, the team releases consecutively, experienced software program, handing over commercial enterprise value chosen via that customer in all iteration. The Customer can make use of this software almost for any purpose, either for evaluation or maybe perhaps for release to end-users. The maximum essential component is the truth that the software program is seen and given to the consumer on the quit of generation. This continues everything open and tangible.

Secondly, XP teams release software habitually for end-users too. XP Web projects are released on everyday basis, in-house projects monthly or possibly more frequently. Even reduce-wrapped items are shipped simply as tons as quarterly, it would no longer appear a opportunity developing true editions of this often, however XP groups for the duration of appearing everyone in all it in sufficient time. Observe the phase on non-stop Integration for greater using this, and comprehend those common releases are stored dependable by means of XP's obsession with testing, as described right here in purchaser assessments and take a look at driven improvement [19].

Simple Design

XP teams build software program into a simple layout, wherein they begin simple through programmers testing and design improvement. An XP team continues the design precisely. There are surely layout steps in launch making plans and generation planning, plus the working groups engage in quick design periods and layout revisions through refactoring all the way all through the direction of the complete mission. With an incremental iterative process like excessive Programming an amazing design is important. This is the reason why there's always loads of recognition on design throughout the complete improvement.

Pair Programming

This exercise ensures which all manufacturing code is reviewed by means of the minimum of one or more other programmers, coming to an end with better design, higher testing, and be better code. Research on pair programming has confirmed that pairing produces higher code in about exactly the identical time as programmers working singly. Maximum programmers who study pair programming choice it, so we distinctly propose it then hooked on all teams. Pairing, similarly for providing better code and assessments, also serves to communicate know-how across the complete group. As pairs switch, surely all and sundry has got the blessings and benefits of all people's specialised knowledge. Programmers learn how to enhance their competencies and additionally that they

grow to be pass wished for the team and then to the organization. Pairing, even by using itself outdoors of XP, is obviously a big win for every character.

Test-Driven Development

Extreme Programming is possessed with comments and also in software development with appropriate feedback calls good trying out. XP teams practice test-driven development, tasks performing in very short cycles along with a test, then that is how can make its work. Almost effortlessly, teams produce code with nearly 100% test coverage, which happens to be an exceptional success in various shops. It isn't sufficient to write tests: you should run them. Here, as well as Extreme Programming is tremendous. These programmer tests or unit tests could be composed together and each time any programmer releases any code towards the repository. This means programmers get immediate feedback on how they're doing. Moreover, these tests provide invaluable support clearly as the software design is enhanced.

Design Improvement

Extreme Programming places recognition on handing over commercial enterprise values in every iteration. To attain this at some stage in the period of the complete venture, the software program will have to be properly designed. The opposite choice might be sluggish and in the long run get stuck. So XP may use a way of continuous layout improvement referred to as refactoring. The refactoring system places cognizance on elimination of duplication and on growing the cohesion of l's code, even as reducing the coupling. High cohesion along with low coupling have confronted being recounted as properly designed code. The end result is due to the fact XP teams get you started out a dependable, simple layout, and usually own a great, easy layout specially in your software program. This permits them to preserve their development speed, and, the reality is, typically boom velocity such as the task goes forward. Refactoring is, naturally, sturdy subsidized up by means of comprehensive checking out that assures that much like the design evolves, not anything is damaged. As a consequence the client aspect tests and programmer aspect checks are simply important allowing issue. The XP practices sustain some other: they are recognized for being absolutely more potent collectively than one after the other.[20].

Testing

This phase performs the testing upon the developed application whether the developed projects meets the customer requirements or not. A manual testing is performed within this approach for software testing. Our approach is basically a web based application therefore written test case ought to be supportive to this application.

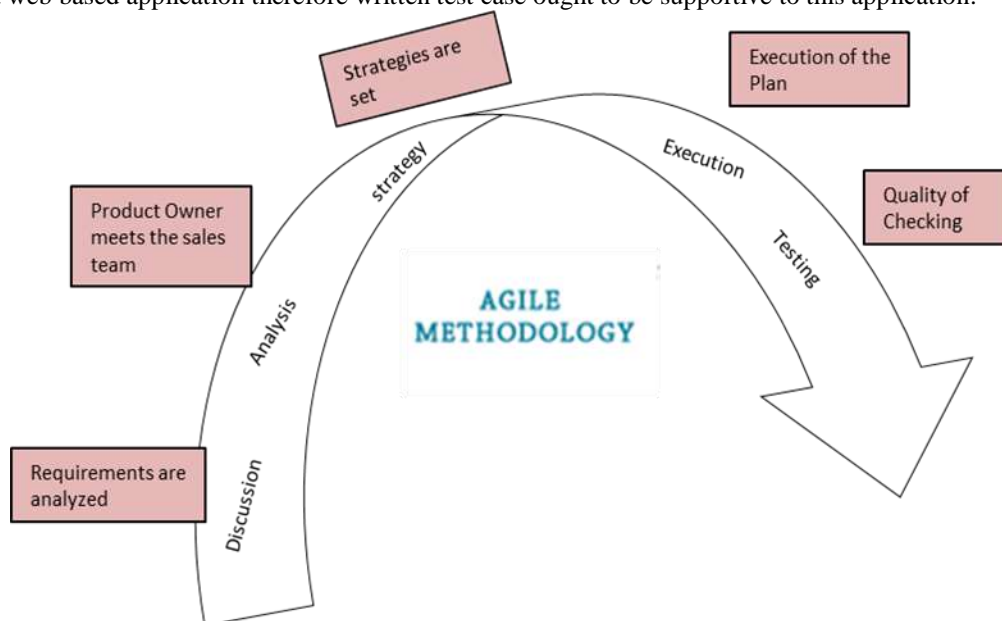


Fig 4. Testing in Agile Methodology

The testing procedure within this approach can be referred to in figure 2. Each phase in agile technology as well as having the corresponding actions may also be described in above diagram. This section discussed the proposed methodology and to discover the working procedure of web application is explained in depth. The subsequent section allows the detail about the agile using web development of the research work.

RESULTS AND DISCUSSION

This section describes the performance evaluation of the proposed research work. Netbeans IDE is utilized to develop the proposed approach of XP. It is powerful model and simulation tool for developing the web and desktop application. The web pages are designed using the JSP in J2EE. This work is compared to the existing methodology (without SDLC life cycle).

The above graphs and table shows the performance of proposed work.

Fig 5 and table 1 describes the evaluation report of proposed web application development mechanism. The execution time and memory consumption of this work is very low compared to the previous work. The execution time and memory is 500s and 650 Mb respectively. The graphical representation of this work is shown in figure 5 for easy understanding.

Fig 6 and table describes the evaluation report of previous web application development mechanism. The execution time and memory consumption is high. The execution time and memory is 720s and 600 Mb respectively. The graphical representation of this work is shown in figure 6.

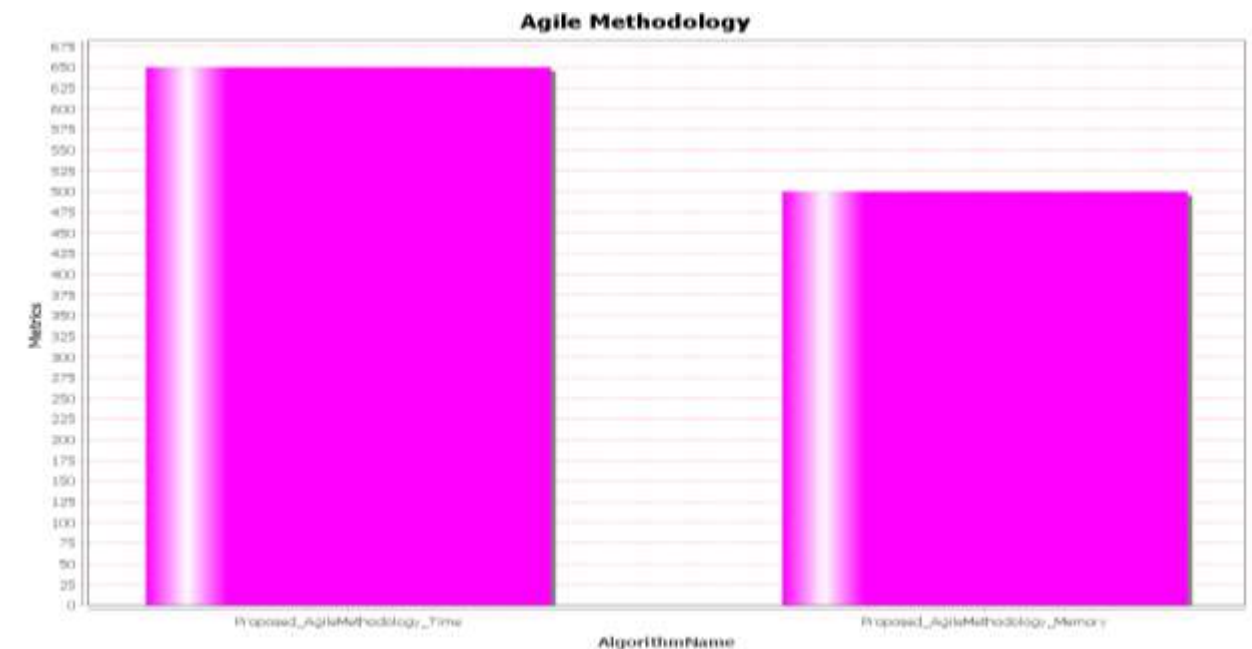


fig 5 Proposed Agile using XP

TABLE 1. Proposed Agile using XP

Algorithm	Metrics
Proposed agile methodology Memory	650
Proposed agile methodology Time	500

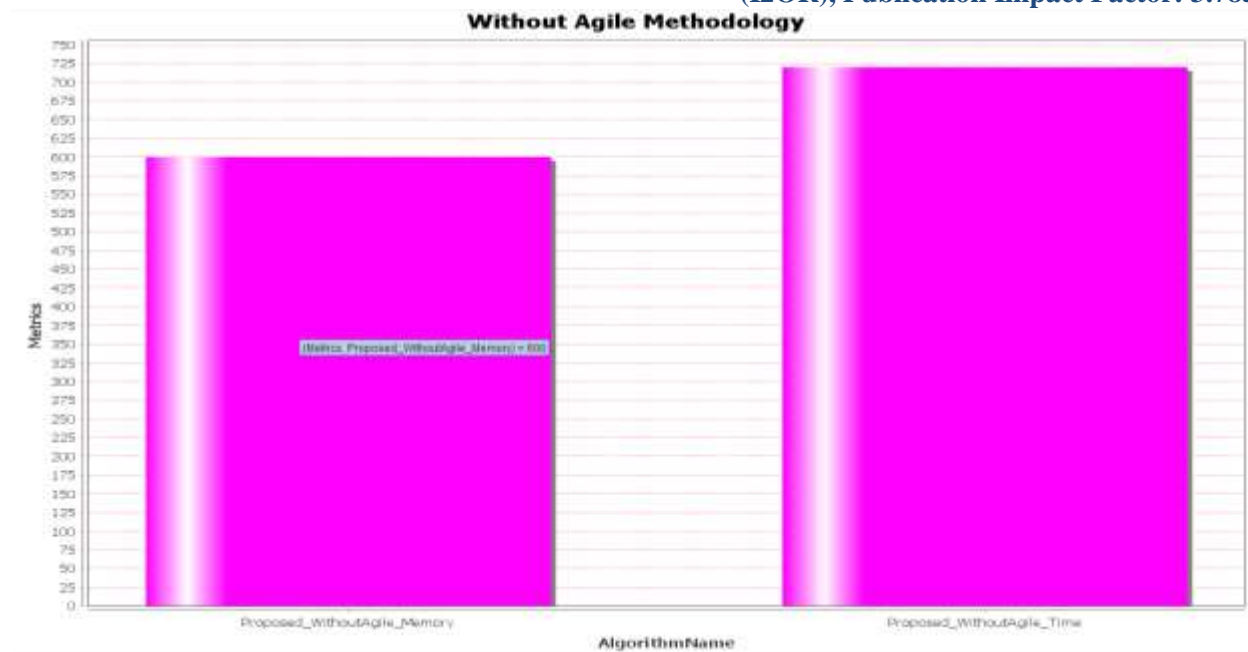


fig 6 Proposed without Agile methodology

Table 2 Proposed without Agile methodology

Algorithm	Metrics
Proposed without agile Memory	600
Proposed without agile Time	720

CONCLUSION AND FUTURE WORK

This paper summarizes the important contributions and the majority significant achievements associated with this research work. It attempts to highlight the research contributions in the field of adopting an Agile approach for the successful development web applications and discusses the proposed Agile model in association with various other findings of the research study. At the same instant, the limitations and suggestions for the future scope of the research work can also be mentioned, ensuring that researchers who definitely are interested by extending any of this work can possibly explore the possibilities.

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