

# Software Development Life Cycle for Web Application by using Traditional Methodology vs Agile Methodology

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**Abstract-** Life cycle software development is concerned in the software development process (SDP), which inspects the software development region. Life cycle of software development (SDLC) is a technique that assures that the software abides by the recognized necessities. In this methodologies, to create the method more effective and also conventional it applies numerous grades in the SDP. In this work, the heavy class methodology (traditional SDLC) and as well the Lightweight Methodology (Agile SDLC) are explicated and also conducted a correlation betwixt the policy of Method.

**Keywords:** Life cycle of software development (SDLC),  
**Techniques:** traditional and agile.

## I. INTRODUCTION

The construction of laptop Application programs along with records designs is constantly dictated through specific development methods. A software program improvement (SPI) methodology mentions the structure that is utilized to manage, plan, and manipulates the procedure of construction of a record system. Generally, a SPI methodology is termed SDLC. This methodology is partitioned into some stages that contain 1) Requirement Analysis (RA), 2) Design, 3) Code, 4) Test, 5) Install, and 6) Maintenance are all steps in the software development process. Software testing is a technique to determine if the actual software product matches expectations and is free of bugs. It involves human or automated execution of software/system components to evaluate one or more attributes of interest. The goal of software testing is to find bugs, holes or unmet requirements compared to the written requirements. Some like to say that software testing means white box and black box testing. In simple terms, software testing means validation of the application under test (AUT). This software testing course introduces software testing to the general public and explains the importance of software testing. Few people dispute the need for quality control when creating software. A brand's reputation can be damaged by late deliveries or software bugs, which can lead to anger and loss of customers. In extreme cases, a bug or vulnerability can damage connected systems or cause serious problems. Think of

Nissan being forced to recall more than a million vehicles after a software bug in the airbag sensor detector. Or a software flaw that prevented the launch of a \$1.2 billion military satellite. 2 The data speaks for itself. In the United States, software bugs cost the economy \$1.1 trillion in assets in 2016. Additionally, they affect 4.4 billion consumers. Although testing is expensive, companies with effective testing techniques and quality assurance processes can save millions of dollars each year in development and maintenance. Initial software testing reveals problems before the product is launched. Early development teams get feedback on testing; sooner they can fix issues like: • Architecture bug • Bad design decision • Invalid or incorrect functionality • Security vulnerability • Capability issues scalability as the tests have enough room during development, the reliability of the software increases and the high product programmers have fewer bugs. A system that meets or even exceeds customer expectations can increase sales and market share.

## Requirement Analysis

This section is mainly intended to recognize the actual needs of clients and also to folder requirements appropriately. The importance of RA is to discover what is required as of the method. In SDLC, it is a significant level. Software Requirement Specification (SRS) is the outcome of RA that affords a detailed explanation about the SP to be structured.

## Design

In SDLC, it is the highest creative segment. In this segment, the requirement specification is rehabilitated into a plan or else shape. It is a methodology of planning together with trouble fixing for an SP solution. It involves SP builders along with designers to sketch out the plan intended for a solution. Software Design Document (SDD) is the outcome of this segment.

## Coding

In this segment, by utilizing certain programming languages the SDD is changed into code. In SDLC, it is

the logical segment. Software code is the outcome of this segment.

### **Testing**

Following the coding segment, the testing is executed to establish the application's final output. It is performed to discover the original output along with the forecasted outcome. It is a significant and as well powerful segment. High graded SP products, reduced maintenance cost and also perfect in addition to dependable outcomes are provided by this testing segment.

### **Maintenance**

It is the final segment of SDLC, in which the SP being developed is sent to clients who utilize it for the appropriate processes.

### **SDLC Models**

There are different SPI methods illustrated and also structured that might be utilized via SPI methodology; those methods are also termed as "SDP Models". Every single method pursues a particular lifestyle series to obtain specific achievements in the method of SPI.

#### ***Traditional Model***

It is the typical version of SP manufacturing [1] moreover its miles are termed as a linear-sequential lifestyles iterative version. It describes a little prime function that is completed in series: a) necessities definition, b) architecture layout, c) special layout, d) implementation, e) thing verification, f) integration verification and g) necessities validation. In this method, every single segment should be completed prior to the start of the later segments. At the completion of every single segment, an assessment is conducted to make a decision whether the task is on the correct path and also whether to persist or else remove the task. And this method provides a a starting point for a variety of lifecycle strategies [1][2].

#### ***Spiral Model***

It is an incremental method, by means of a greater accent positioned on risk evaluation. It has 4 stages, namely Risk Analysis, Planning, Evaluation along with Engineering, An SP mission goes by those steps in iterations (called Spirals on this version). Beginning with the development stage, the requirement is collected as well as risk is analyzed in the base spiral. Each spiral makes at the base spiral. Necessities are gathered throughout the development segment. In the portion of hazard evaluation, a method is executed to detect hazards along with varied solutions. In the last part of the risk evaluation section, a model is being developed. In the engineering phase, the software is created and at the conclusion, testing is performed. The project's outcome is evaluated by the client in analysis to update prior to the work begins to the following spiral [3].

#### ***Iterative Model***

It is a technique that offers a novel scheme to the developing models that could provide speedy outputs, require fewer details, and offer higher flexibility. In this phase, the model is separated into small sections. This lets the development team to display the outcomes in advance together with that attain valuable comment from clients. Usually, emphasis is a mini-waterfall procedure with the response as of a segment offering significant facts for the making of the following phase. In this method, the system is evolved and also enhanced via several steps and hence the risks are predicted in advance. Hence the defects' downward movement is averted. In this, the feedback of the responsible person is provided.

#### ***Incremental Model***

This model partitions the components, wherein the mission phases are produced and inspected individually. This method probably detects the errors. Like the lifecycle models, the requirements of the last method are approved initially in the incremental phase. In this, reserved requirements are allotted to iteration; together with every consecutive (internal) commenced needs are handled in anticipation of the final (external) launch fulfills all needs [2].

#### ***Prototyping Model***

It is a running model that is comparable to the product. [4] It is a usable device that is developed rapidly with reduced cost, and also intended to alter or modify it via a full-scale and as well completely functional system. [5] It allows the clients to comprise a communication by means of the design that allows offering higher feedback along with specifications.

#### ***V-Shaped Model***

This model performs successively. Every single phase should be ended prior to the start of the following phase. Before the execution of the coding, the process of testing evolved, during every phase's previous execution. The needs of this model are equivalent to the waterfall model. Prior to the evolvment, the test plan is produced. The assessment plan's focus is to fulfill the specifications pointed out in the necessities collected. The high-level design concentrates on the models' design together with architecture. Nevertheless, the low-level design phase appears where the original SP is structured, and as well unit tests are also produced in this stage. [1]

#### ***RAD Model***

It's a common incremental model. In this, additives else competence enhanced simultaneously as it was provided with small-projects. The traits are obtained along with that are arranged into an operating prototype. This can rapidly provide the client with somewhat to peer besides utilize to offer response regarding the transmission together with their supplies.

### **Traditional SDLC (Heavyweight Methodology)**

These methodologies are planned wherein paintings start evolved with the evocation and additionally documentation of the complete set of necessities, analogized to the buttress of utilising architectural and as properly high-level format development together with the examination. [6] This method is termed as a heavyweight, as a consequence of these heavy factors. These methodologies are centred on certain steps such as answer building, trying out, definition, and also deployment. Initially, the needs are stated as well as documented in these Heavyweight methodologies. Software models like the Waterfall approach, V-Model, together with RUP have been termed as traditional SPI methodologies along that these are organized into heavyweight methodologies. It will be liable to remodel a huge portion of the SP methodology in the first-rate element for an expanded period. This methodology pursues an engineering field wherein the enhancement is expected and also repeatable. A huge level of significance is occurred on the model concentrating on the system's requirement efficiently. A significant model in heavyweight models is the huge layout upfront (BDUF) method, wherein a perception that it is probable to the buildup of the client's necessities before coding. And this method is successful in engineering fields that make it engaging the SP production.

### ***Characteristic of Traditional Methodology***

The conventional SPI approach's feature is mostly centered on '4' steps. Installing the requirements for the undertaking is the initial step. It determines the period taken for enforcing the different levels of enhancement while expecting any problems that arise with the undertaking. The movement into the layout together with the architectural planning segment is the succeeding step wherein a technological infrastructure is generated inside the shape of diagrams or else designs. The mission moves into the enhancement segment after the group is happy regarding the architectural and layout plan where the code is generated until the specific dreams are attained. For making sure whether the issues are discussed early on, the checking out segment is often overlapped with the enhancement segment. The purchaser becomes a part of the checking out together with comments cycle after the purchaser satisfies it and the finishing touch is approached by the mission and the builders are close to the assembly of the mission necessities [7]. The crucial nature of the conventional SPI existence cycle is as: Apprehending the users' requirements, crafting a strong layout, developing SP perfectly, and putting a helpful gadget that fulfills person necessities are the dreams. For addressing risks, there exists a heavy emphasis on making plans. Such a technique presumes that troubles are adequately explained. Via widespread and up-the-front making plans, an optimum answer might have arrived. The approaches are predictable and might be optimized along with repeated. The approaches might be accurately estimated

which is primarily centered on that belief. The assets of versions may be identified along with handled in the course of the enhancement existence cycle. The conventional SPI existence cycle is very process-centric in summary.

### **Agile SDLC (Lightweight Methodology)**

A compilation of SPI techniques which might be frequently targeted on iterative together with incremental development is called Agile Software Development, in which necessities and solutions expand thru collaboration among self-organizing, centered teams [8]. Quick and flexible responses to varying requirements are enabled by the approach together with it supports evolutionary development, adaptive planning, and also delivery along with a "time-boxed" emphasis approach [11]. Foreseen interactions are promoted by a conceptual framework during the enhancement cycle. A complicated method is software advent if it isn't performed accurately. Communication, flexibility, along with proper analysis is the key to a successful SP task [12] in order that the agile technique is followed for SP enhancement. It possesses the capability of evolving while matters change. A conceptual framework for projecting any SP engineering projects is called the agile improvement technique [13]. Agile methodology is a technique that encourages continuous testing and development throughout the software development lifecycle of a project. Unlike Waterfall method, Agile model for software testing involves concurrent development and testing. One of the simplest and most effective methods for turning visions of business needs into software solutions is agile software development. The term "agile" is used to describe software development methodologies that involve planning, continuous learning and improvement, teamwork, evolutionary development, and early delivery. It promotes adaptive responses to change. When written in 2001, the Agile Software Development Manifesto offered a revolutionary way of thinking about delivering value and interacting with customers. The four core values of Agile are: 1) People and interactions rather than processes and equipment 2) Usable software rather than complete documentation 3) Customer involvement in contract negotiation 4) Adapting to change rather than exploring a plan Agile Framework So what is Agile project management? It is a project management method that involves continuous communication and iterative development. These principles and frameworks for putting them into practice, such as Scrum, Kanban, Extreme Programming (XP), and the Adaptive Project Framework, are now known as agile (APF).

### ***Extreme Programming (XP)***

It is an agile technique, concentrates SPI methodology along with handling the analysis, [30] enhancement, and also testing with novel processes motivated in making a huge distinction to the end product. [14]

### **Crystal Methods**

It has been evolved to manage a number of circumstances together with the particular traits of the issue [16]. Crystal's circle light-weight SDLC methodology is the beginning of Alistair Cockburn [10]. It is made of above 1 method as a consequence of Cockburn's perception that various challenge sorts need differing methodologies [15]. Project sorts are classified as the range of humans at the enhancement group along with the total risk. These methodologies are partitioned into hues coded bands [31]. "Clear" Crystal is the tiniest in addition to lightest. "Yellow", "Orange", "Red", "Maroon", "Blue", together with "Violet" comply by means of to be utilized with huge organizations the utilization of highly complicated methodologies [9].

### **Scrum**

It is basically a lightweight methodology possessing huge applicability intend for handling along with managing repetitive as well as incremental schemes of the complete sorts [17]. It became famous within the SP network on account of its ease and also definite productivity [18]. This methodology focuses on a particular way to control challenges within a group mainly centred on completely enhanced circumstances [19].

### **Feature-Driven Development (FDD)**

It is a short-generation SPI method [32]. This methodology started by setting up a widespread model pattern [9]. This is conducted by a series of "layout through feature, construct through feature" iterations [20]. It contains 5 sequential phases such as plan through feature, increases a universal version, layout through feature, construct a functions list, and construct through feature [33]. Initially, the first 3 phases are performed [21]. The final stages are the method's iterative phase which aids the agile methodology with detailed diversifications to past modifications in requirements along with enterprise wants [6].

### **Characteristics of Agile Technique**

The taking after are the prime errand of the dexterous demonstrate that varies from the overwhelming weighted strategy [22].

- Adaptive
- Empirical Process.
- People-oriented.
- Team Competence
- Small Self-organizing teams. [8]
- Conformance to Actual.
- Collaboration.
- Balancing Flexibility and Planning. [34]
- Decentralized Approach. [35]
- Simplicity.

Agile methodologies are the subset of iterative along with evolutionary methodologies. Iterations are little to offer additional well-timed feedbacks to the business enterprise group [23]. Extreme Programming is mainly centred on 4 values along with 12 particular software improvement applications. Crystal's circle of related methodologies is mainly centred on the features of the project and also the group [36]. Scrum specifically provides venture administration values. The model permits the group liberty to select its certain advancement practices [24]. It has the utmost evaluation together with layout practices [10].

### **Traditional Vs Agile Technique**

Even though the agile methodology is centred upon iterative development, there are certain key differences betwixt the agile and conventional methods [25]. Traditional methodologies utilize development plans as their administration system, whilst agile methodologies utilize the comments from the clients as the prime management mechanism. [26] The agile technique is also termed a people-centric approach [37]. The agile model can offer an operating model associated with standard methodologies so that the client can understand a number of the advantages [27]. In contrast with other standard methodologies, the agile method's testing time is low [38]. Several conventional methodologies are extremely nonflexible when analogized to the agile technique [28]. On account of these benefits, agile is employed above the other conventional models [29].

**Table 1.0** Agile approach vs Traditional approach

<b>Characteristics</b>	<b>Agile approach</b>	<b>Traditional approach</b>
Organizational structure	Iterative	Linear
Scale of projects	Small along with medium scale	Large-scale
User requirements	Interactive input	Completely explicated before execution
Involvement of clients	High	Low
Development model	Evolutionary delivery	Life cycle
Customer involvement	Customers included as of the time work is being executed	Customers are included initially in the project but not after the execution has begun
Escalation management	When issues occur, the whole team functions together to solve it	Escalation to managers when an issue occurs
Model preference	Adaption is supported by agile model	Expectancy is supported by the traditional model

Product or process	Less focus on formal as well as directive processes	It is more serious concerning processes when contrasted to the product
Test documentation	Comprehensive test planning	Tests are planned one sprint at a time
Effort estimation	Scrum master assists along with the calculation are done by the team.	The project manager estimates and attains approval as of PO aimed at the whole project.
Reviews and approvals	Reviews are performed after every single iteration	Excessive reviews along with approvals by leaders.

## II.CONCLUSION

SDLC is a model that manages the whole development system. In this research, The Traditional model offers the basis for numerous developmental processes. Modern SDLC is partitioned into 2 types: traditional SDLC along with agile SDLC. In this study, the outline and the features of the traditional along with agile SPI model are provided. In addition, 4 methodologies like crystal, XP, FDD, together with Scrum are overviewed. Hence, the evaluation betwixt the agile along with the conventional methodologies is proved.

## REFERENCES

- [1] L. Rising and N. S. Janoff, The Scrum software development process for small teams, IEEE Software, Issue 17, pp. 26-32, 2000.
- [2] K. Schwaber and M. Beedle, Agile Software Development with Scrum, Upper Saddle River, NJ, Prentice-Hall, 1st Edition, Oct 2001.
- [3] Julian, Brendan, James Noble, and Craig Anslow. "Agile Practices in Practice: Towards a Theory of Agile Adoption and Process Evolution." International Conference on Agile Software Development. Springer, Cham, 2019.
- [4] Puleio, Michael. "How not to do agile testing." In Agile Conference, 2006, pp. 7-pp. IEEE, 2006.
- [5] Abrahamsson, Pekka, et al. "Agile software development methods: Review and analysis." arXiv preprint arXiv:1709.08439 (2017).
- [6] Pawlak, Michał, and Aneta Poniszewska-Marańda. "Software Testing Management Process for Agile Approach Projects." Data-Centric Business and Applications. Springer, Cham, 2020. 63-84.
- [7] Padmini, K.V.J. & Kankanamge, P.S. & Bandara, Dilum & Perera, Indika. (2018). Challenges Faced by Agile Testers: A Case Study. 431-436. 10.1109/MERCon.2018.8421968.
- [8] Rajasekhar, P. & Yadav, Dr. (2013). Critical Issues in Software Testing During Agile Development.
- [9] Al-Zewairi, Malek, et al. "Agile software development methodologies: a survey of surveys." Journal of Computer and Communications 5.05 (2017): 74.
- [10] Stolberg, Sean. "Enabling agile testing through continuous integration." In Agile Conference, 2009. AGILE'09., pp. 369-374. IEEE, 2009.
- [11] Rajput, Barkha. "Software Quality Assurance Using Agile Software Methodology in Education Assessment Industry." (2016). Authorized licensed use is limited to NUST School of Electrical Engineering and Computer Science (SEECs). Downloaded on February 12, 2021, at 07:10:50 UTC from IEEE Xplore. Restrictions apply. 2020 14th International Conference on Open Source Systems and Technologies (ICOSST) 978-1-7281-9050-1/20/\$31.00 ©2020 IEEE
- [12] Collins, Eliane, Arilo Dias-Neto, and Vicente F. de Lucena Jr. "Strategies for agile software testing automation: An industrial experience." 2012 IEEE 36th Annual Computer Software and Applications Conference Workshops. IEEE, 2012.
- [13] Stolberg, Sean. "Enabling agile testing through continuous integration." In Agile Conference, 2009. AGILE'09., pp. 369-374. IEEE, 2009.
- [14] Agile Marketing Documentation. Last Accessed 2020. www.agileherpas.com/blog/state-of-agile-marketing-2020
- [15] Matharu, G. S., Mishra, A., Singh, H., & Upadhyay, P. (2015). "Empirical study of agile software development methodologies: A comparative analysis". ACM SIGSOFT Software Engineering Notes, 40(1), 1-6.https://doi.org/10.1145/2693208.2693233
- [16] Jammalamadaka, K., & Krishna, V. R. (2013). "Agile software development and challenges". International Journal of Emerging Technology and Advanced Engineering, 3(6).
- [17] Rodríguez, P., Mäntylä, M., Oivo, M., Lwakatare, L. E., Seppänen, P., & Kuvaja, P. (2018). "Advances in Using Agile and Lean Processes for Software Development". Advances in Computers(Vol. 113, pp. 135-224). Elsevier.
- [18] Erickson, J., Lyytinen, K., & Siau, K. (2005). "Agile modeling, agile software development, and extreme programming: the state of research". Journal of Database Management (JDM), 16(4), 88-100.https://doi.org/10.4018/jdm.20051001
- [19] Abrahamsson, P., Salo, O., Ronkainen, J., & Warsta, J. (2017)."Agile software development methods: Review and analysis". arXiv preprint arXiv:1709.08439.[19]Schmidt, C. (2016).
- [20] Agile software development teams. Springer International Publishing.
- [21] Khurana gourav and s gupta(2012) " Study & Comparison of Software Development Life Cycle Models" IJREAS, Vol. 2(2), 1514-1515.
- [22] Wallin Christina and Land R. "Software development Life Cycle models the basic type", 2.
- [23] Nabil Mohammed Ali Munassar Ali and Govardhan A (2010) "A Comparison between Five Models of Software Engineering" International Journal of Computer Science, Vol. 7(5), 98-100.
- [24] Tuteja Maneela and Dubey G.(2012) "A Research Study on Importance of Testing and Quality Assurance in Software development life cycle (SDLC)Models" International Journal of Soft Computing and Engineering, Vol. 2(3), 251-252. http://www.iscanotes.com(2011), 5-6 (accessed 11th July 2013)
- [25] Awad M.A. "A Comparison between and Traditional Software Development Methodology" 1-7
- [26] Yu Beng Leau, Loo W.K., and Wai Yip Tham.(2012) "SDLC Agile vs Traditional Approach", International Conference on Information and Network Technology, vol. 37, 162-165.
- [27] Harish Rohil and Syan Manisha(2012) "Analysis of Agile and Traditional Approach for Software development", International Journal of Latest Trends in Engineering and Technology, Vol. 1(4),1-3
- [28] T Bhuvaneswari and Prabakaran S.(2013) "A Survey on Software development life cycle model", Journal of Computer Science and Information Technology, Vol2 (5), 263-265.
- [29] Laurie Williams (2007) "A survey of Agile development Methodologies",215-218.
- [30] Schwaber, K., & Beedle, M. (2002). Agile software development with Scrum (Vol. 1). Up-per Saddle River: Prentice Hall.
- [31] Williams, L. (2010). "Agile software development methodologies and practices". Advances in Computers (Vol. 80, pp.1-44). Elsevier.
- [32] Chopade, M. R. M., & Dhavase, N. S. (2017). "Agile software development: Positive and negative user stories". 2nd International Conference for Convergence in Technology

- (I2CT) (pp. 297-299). IEEE. <https://doi.org/10.1109/i2ct.2017.8226139>.
- [34] Cohen, D., Lindvall, M., & Costa, P. (2003). Agile software development. DACS SOAR Report, 11, 2003.
- [35] Franková, P., Drahošová, M., & Balco, P. (2016). "Agile project management approach and its use in big data management". *Procedia Computer Science*, 83, 576-583. <https://doi.org/10.1016/j.procs.2016.04.27>
- [36] Rijwan Khan, Akhilesh Kumar Srivastava, Dilkeshwar Pandey. Proceedings of the SMART -2016, IEEE Conference ID: 39669 5th International Conference on System Modeling & Advancement in Research Trends, 25th-27th November 2016 College of Computing Sciences & Information Technology, Teerthanker Mahaveer University, Moradabad, India Agile Approach for Software Testing Process.
- [37] Samar Al-Saqqa, Samer Sawalha, Hiba Abdel-Nabi. Agile Software Development: Methodologies and Trends Article in *International Journal of Interactive Mobile Technologies (iJIM)* · July 2020..