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Rapid Applications Development Techniques: A Critical Review

Riffat Naz and M. N. A. Khan

Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST)
Islamabad, Pakistan
rifftanaz704@gmail.com, mnak2010@gmail.com

Abstract

There are different product maintenance and support techniques. These previous techniques do not solve user/clients bugs, issues and enhancements effectively and efficiently. Scrum is being used now a day as a quick, flexible and holistic methodology to develop software. In Scrum projects there is the much customer involvement is included which help to develop a user oriented product. Users can change their requirements in Scrum. Many techniques have been proposed for product maintenance and support. However, in this paper, there have been a detailed literature review of existing product maintenance techniques and also presented a new proposed model and technique for the product maintenance by using Scrum methodology. This Scrum based model for maintenance is designed and based on the analysis of client request types and severity (priority). In our approach, The Session attendees (Scrum Master, Product Owner and Team) choose that bug, issue or enhancement first which has an urgent type or higher priority request and resolves it then select low priority request or non-urgent requests and facilitates the clients in timely manner. In this way this proposed model works effectively and defiantly to meet the customer's demand. A comprehensive study on product maintenance and support has been carried out which adds to the current practices in the scrum. We found that maintenance phase of the scrum has been given less attention in the existing literature. In view of this, we have made an attempt to propose a novel model that focuses on the maintenance phase of scrum.

Keywords: *Rapid Application Development, Agile Software Development, Scrum, Extreme Programming, Product Backlog*

1. Introduction

Congratulations! Rapid Application Development (RAD) a methodology to develop software that requires minimum planning for rapid prototyping. For software developed planning is done by using RAD that is furnished with all the writing of the software itself. As James Martin says, RAD is a lifecycle used for development of software which provides faster development and also gives high quality software then by using traditional software development lifecycle. RAD facilitates organizations in development of software faster and it also helps reducing development cost and maintains quality of software. This technique is attained via chain of verified methods to develop application in a distinct line. RAD is in contrast to the structured development methodologies, has short development time but traditional development methodologies or structured development methodologies have long development times. In addition, the later techniques are also difficult to understanding.

In Short, RAD is the process which accelerates the cycle of development of an application. RAD makes it possible to develop quality products faster, thus valuable resources can be saved. RAD consists of the following four phases:

a. Requirements Planning phase

b. User design phase
c. Construction phase
d. Cutover phases

Rapid Application Development (RAD) can be considered as a type of Agile technique or vice versa. This approach is highly interactive. RAD is a mean to produce the high quality software development. This software is less in cost and proficient also consumes less time. It is now becoming a necessity to fulfill the latest requirements of the software industry. As the Ed Yourdon said that information technology is now a consumer commodity. So the developers of software should accept this truth in way of adopting modern means to fulfill consumer demands.

RAD term was used for the first time in 1970s. In 1970 and onward years traditional lifecycles were rigid. That result in poor and unusable systems. RAD is a solution for those rigid, stage wise or waterfall models of development. Spiral model was introduced by Barry Boehm and it is a risk-driven approach, which uses process modeling instead of phase methodology. Boehm's Spiral model separates the development process. After that James Martin extended his work at IBM and made it into a better and further dignified procedure, which is now turned into RAD, known as Rapid Application Development (RAD). James published a book on Rapid Application Development in 1991.

Requirements management is a process which is used to maintain documentation of system, analyzing the system components and giving priority to important components. It is the job or responsibility of project managers and it continues throughout a project. They control changes and communicate related to stakeholders. As the communication is concerned it is important for a successful requirement management that communication should be effective.

2. Literature Review

The basic purpose of the literature review is to analyze the work of other that what type of work they have done and how they have done. In this section I have analyzed different techniques related to RAD, also I did comparison of different papers based on its efficiency for giving quality software, time taken for a project and approach for RAD. Qureshi, *et al.*, [1] proposes a novel process model for Component Based Development (CBD). In development of software CBD is commonly used. CBD provides the facility of reusing the present parts with the novel ones. Component has full functionalities and this is autonomous and free part of the method .The proposed model modifies the phase which serve for analysis of the software development procedure method with CBD procedure method. The authors named the phase used for analysis as analysis and the collection of component. In this phase analyst gathers, identifies and choose parts. These chosen parts can be easily recycled with the help of components repository. This storage area is worked to accumulate and handle the parts which are reusable. According to the authors the foremost advantages attained when they were acting on the parts which are reusable including a repository are Categorization, Exploration, Amendment, Testing, Execution, Managing the version, Alter the control, Advanced and regular maintaining documentations. Author finally makes result that CBD is the one technology which is more economical, reduced in costs, minimizes the time. It is more fruitful and useful for software development.

Legenhausen, *et al.*, [2] state that in modern software development certain tools are joined with a loose knot. They do not interact with each other for example system used to control versions, systems used for tracking bugs and other tools that make sure the fulfillment with convention of codes with each other. Authors present a framework named RepoGuard which Links system used to control versions with

further instruments used for software development. The proposed framework provides interfaces to integrate other tools and allows for utmost control. It also validates each and every one the dedicated resources prior to store everlastingly. RepoGuard presents ways for communication about the failure or success of the procedure. On the whole, RepoGuard gives simple and much helpful resources / ways in the distributed development processes to make sure quality of software and standards. RepoGuard reduces the administrative overhead. It also keeps away from ordinary drawbacks during the development process.

Lin, *et al.,* [3] discussed a tool, used in the development of software and makes it rapid. Proposed tool require a reduced amount of design effort. It enhances the development speed of software. It leads the successful management by enforcing a layer of specification on system parts. Petri net and some other RAD method like scrum functionalities are used. The discussed tool has a layer on system parts. All the management actions are added in a proper way. It improved efficiency of development team. A friendly collaboration is developed among team members. Proposed layer and architecture based method have seven steps. This technique has these benefits like less design work, Rapid software development, Speeds up components construction, Effective management, lesser efforts are needed, productivity increased and team collaboration developed.

Wielsch, *et al.,* [4] discussed the requirement of tool addition in different software developments methods. Authors mainly focus on agile techniques. Assimilation of tools is important because they make it fast, speedy, competent and useful. An open platform techniques is also presented. Many significant motivations are found to integrate it. Decoupling is an important point used for integration. It makes many promises for the substitution of vendor tools. It also helps to add and remove different apps without changing the tool. When there is no app, without any hazard specific functionalities are available easily. These available functions facilitate the programmer and allow development. This technique helps to make advanced and dynamic tool. By using this integration new tool can be created using existing. Particular this heavy function situation allows coupling. By using random development tools apps are easily accessible on large scale. Agile works better here. Technique is based on information dash board, data based used for processes, cockpit used in design and checkers. All the components make apps transparent. A solution suggested for it is the entity meta model. It is used to label individual logic data model. Recent sample implements the above mentioned concept.

Chehili, *et al.,* [5] discussed a Service Oriented Architectures framework for agile development. This framework named as FASOAD. It employs the agile method for SOA development as a component assembly model. As it uses the foundation of Service Component Architecture (SCA) model, so it permits developing SOA projects by implementing agile technique. This future framework is based on two unique and novel involvements. One, SCA model is its foundation and it makes use of its principles. Adjustment and progression can be made at run time or may be when task is being executed. Two, techniques used for supervise and pursue the job improvement are unique and much advanced.

Lin, *et al.,* [6] presents a method which is layer-based and it is for development of software rapidly. This layer-based method follows the course of action of Extreme Programming (XP). XP involve extremely communicative programming languages which can be Java and some other CASE tools. It is cleared that these method in XP focus on software development rapidly but only good for tiny projects or else average sized projects. So for the valuable assistance upon the better development, it enforces a concept which is architecture based but it is layered based design. It is creation of these components in the course of its

activities. In this way productivities of the team can be significantly improved with less expenditure but successful on requirement work. Author mentioned that, for modeling tool this technique uses UML and other technique which is Petri nets. Further for explanation author presented an example of an application in this paper. Author described following suitable software features:

a. This should clearly describe the structural (required activities) and active which are behavioral outcomes of these activities upon each other.
b. It describes appropriate mechanisms which support effective guidance of development.
c. The software development activities should be arranged in an equal style so all team members can take part properly
d. It should maintain projects development rapidly both for small and medium sized projects. It should use fewer operating cost.

For this design-oriented work many alternatives have been proposed like Agile Development, Extreme Programming (XP) and Rapid Application Development (RAD). These methods focused on code work like testing and implementation. Maschotta, *et al.*, [7] says that in the development of a simulation-based system design analysis and validation is not a simple job. Author in this paper presents a framework which allows the rapid development of reusable simulation-based applications. The proposed framework supports agile, evolutionary, iterative, and architecture-centric software development process. For explanation author described an example which is designed and works according to the proposed model. In the proposed model development of each component, implementation of simulation application and optimization are separated. That is why development of these parts is possible in parallel and this is agile software development process. In this proposed framework model and software development both run in parallel. Advantage is a fast prototype is developed, and also the system expert can validate the results of the simulation using the simulation-based application directly. In addition to the advantages of proposed framework besides of agile software development process the system expert can work directly with the simulation-based system design tool. So in this way software errors will be declared soon. Developers can fix bugs earlier. At early stages of product development all additional changes and desired enhancements can be integrated into the tool.

Daud, *et al.*, [8] discuss the objectives of practical training for students. Practical training is important and it prepares the students for their future jobs. Managing application is one of the basic and important tasks in practical training, but manually it is dull and monotonous. For this purpose a method is planned to be developed by using methodology of Rapid Application Development (RAD). The purposed methodology preferred because in real environment RAD permits fast implementation of the system. Development had started on the proposed approach in December-April 2009 in the mid of semester and continued for three semesters. After that it has been proved that RAD is a right methodology for this purpose. It is suitable for small to medium size system.

Rousseaux and Lhoste [9] described that with the faster evolution in IT tools rapid software prototyping is a best way to meet the demands of users instantly. With a classical software development cycle it is difficult to develop an application so fast which normally takes several months for development. By using RAD functionalities and interfaces can be revised with the passage of time. Author mentioned some past difficulties, the rapid prototyping approach corresponding to the web tools. The term "Ajax" first used in a piece of written which is now online. Ajax is a latest way for the applications of web said by Jesse James Garrett in 2005 for the first time. Garrett named this phrase for the architecture and makes it equal like the new production group of web Applications. These new productions can be Google maps. Ajax cannot be said as a

actual language of programming. This is a advanced design model. It is made up of a lot of connected technologies and thoughts. With the use of Ajax in applications of web we can get back data to the server asynchronously. Ajax helps in retrieve of data with no intervention on display. It refreshes the webpage without reloading it again. Some technologies implicated in Ajax are XHTML, CSS, XML, XSLT and JavaScript. Mostly web sites use AJAX. Like Facebook, Netvibes, Flickera and Google maps. This technology brought more flexibility and interactivity in WebPages. It adds functionalities like desktop to the web sites. Its aim is to almost finish the gaps between web and desktop.

Lim, *et al.,* [10] discussed a way to develop multi user applications in distributed environment rapidly. The authors [10] present the way which give adequate support as well as advanced mechanisms which can be achieved by means of middleware. The authors [10] propose a new communication middleware (CM) for communication system. It is an application-level communication middleware. It allows development of applications which is used in multi user environment. CM makes this development an effortless and speedy in an efficient way, which is the property of RAD. This proposed CM facilitates easy, speedy and efficient development of network which support for the applications works in multi-user mode. Author mentioned the drawbacks of previous middleware and other approaches like socket level that they do not support fundamental requirements of the communication system. Existing approaches also take much more time in development to work in a multi user mode. This discussed CM gives applications that are trouble-free advanced application programming interfaces (APIs). This advanced APIs are necessary functionalities. By means of this CM, developers can execute applications which work in multi user mode with the help of only some configuration files and calls of function. Parameters and files of other configuration can be effortlessly altered in it if anyone needs different options of fundamental requirements. By using CM applications for the distributed environment can be created with a lesser amount of development time.

Sohaib and Khan [11] discuss Extreme Programming (XP) which is the form of agile software development, Usability and Discount usability. Authors proposed an integrated approach discount usability engineering in XP process. Authors describe the way in which usability can be incorporated with the XP for an effective usable software system. Authors mentioned in the document discount usability which includes scenarios, card sorting, heuristic evaluation. Discount usability can be used with least and fewer set of support. It can be incorporated into lifecycle of XP project. Issue discussed by authors is that XP does not consider usability because it is a heavy process, for this issue authors proposed the discount usability technique which it lightweight. This proposed technique consists on unofficial fundamental usability testing methodology that is why it can be carry out easily and rapidly without consuming much cost. It could be used early during the design part but will need prototypes. In XP approach discount usability is very handy because in XP requirement elicitation said to be a nonstop procedure. Many discount usability techniques in any part of project can be used. The proposed integrated approach has an immense outlook by involving end user.

Ye, *et al.,* [12] discuss that how to recover feeble performances of soft core by specializing coprocessors for better performance by implementing multi-processor architecture system on field-programmable gate array (FPGA). Author mentioned that for this method we need Clear-cut programming models at the application level which will easily map applications and will provide an efficient code production without rewriting. Author proposed this as a key for RAD which works on reconfigurable Multi processor system architecture. Scalable architecture model (XPSoC) methodology is used in proposed approach also included a set of API which makes application simple in data flow. A scalable architecture models (will work with fewer API and some

reconfiguration). The objective of the proposed approach is to optimize architecture efficiency by adapting hardware resources according to variable application requirements.

This approach improves and simplifies the design of reconfigurable architectures because predefined architectural models are in it. Software and hardware configuration files are placed in open networked databases. A unique ID FUID is used to retrieve configuration files for each function. The proposed approach is used to make rapid application development (RAD) for multi-processor systems. It is easy to reconfigure the MPSoC by using RAD. It saves time and effort. Cost effectiveness is also a important part of this approach. It optimized the design of MPSoC. The proposed approach results a simple solution for MPSoC on FPGA. It gives a chance to get the most out of on design by reusing with the help of bitstream servers. Bitstream servers present standard for the functions to implement them.

Gerber, *et al.*, [13] discuss Rapid Application Development (RAD) methodologies and their implications at some stage in the development. They discussed both of large systems and complex systems. The objective of RAD methodologies is to ensure client participation into the software development process like analysis, design and implementation. By using iterative construction approach it also speeds up the system development phases. RAD is a better methodology for small to medium size systems. When RAD is applied into the development of large and complex systems some unanticipated practical implications were found as described later. All stake holders' communication is official and proper. When all stake holders approved any decision it is captured into the documentation of the system. The research approach described in study discussed is derived from a case study. The system discussed in this case study is the achievement of a development team that was small but that was much competent. They adopted one of a RAD methodology that was agile development approach. Gerber, *et al.*, [13] selected this approach because it is lightweight and it offers reduced cost and development time. After the case study they found some practical implications as: Confusion among Team Members related to positions. In traditional SDLC analyst performs requirements elicitation and all other analysis activities. Analyst gathers requirements by communicating with clients and makes a initial high-level design. In the next stage, a team of architects and member of developers construct the system. While RAD methodologies exclude the role of system analysts and allocate an obvious role to the developer only.

As the developers directly interact with the clients instead of analysts for requirements so they give importance to the fast construction and development of a system. Developers have power to take the important decision therefore they take decisions about design which are habitually technology driven. In actual, their decision should be based on the requirements of project and clients. In RAD methodologies when developers directly interact with the client, they use technical terms and it cause misunderstanding and confusion. As a result system is not optimal for the client. In traditional SDLC methodologies analyst do this work in a effective way. RAD methodologies are less rigid and it uses continuous feedback from client rather than including a formal design review by all stakeholders so in this way it is difficult to differentiate between functional requirements and non-functional requirements of the system. The developers also give priority to those requirements in the implementation phase. They give importance to those requirements which are important for developers instead of those, which are important for the overall project. In RAD methodologies, rapid delivery is focus point and it directs to the some error/exclusion of the design process. The design segment is just added in the first phase then using iterated process implantation phase is changed without execution of design.

Frakes and Kang [14] discuss research on software reuse, major contributions and unsolved problems. Software reuse is constructing new software by using the existing software. Its idea is to get better and advance software quality as well as its yield/output. Reusability has importance as a result of these reasons: to build a bigger and complex systems which is more reliable, a reduced amount of expense used, makes sure delivery on fixed time. Previous methods used in software engineering were insufficient and poor. Most software systems were designed according to a specific domain. With the passage of time as domains changed system also need to be changed. It is hard to replace a system by designing it again. That is why software reuse is a better approach to meet the new domain requirements. Quality and productivity can be enhanced. It also makes betterment in the process software production. Unsolved problems are these: One problem is scalability it arises when reuse is applied in large and complex systems. This will automate the construction. Another important problem is sustainability. This was a major trouble is to search the sustaining ways. These ways will work in long term reuse programs.

Loffler, *et al.*, [15] discussed a method of agile which is scrum. This method has much customer participation. It gives ease of techniques that are used in the analysis of requirements and testing. Automation cannot be tested fully because development is a incremental and continues process. It needs much hard work and labor. To deal with the above mentioned problems authors [15] proposed this model. This model is consists of different useful techniques which are important in maintaining the record of users requirements. These techniques are in the nature models that are already tested. This model can be used by both testers and developers. It is easy to adopt and language used in it is simple. Test scripts derived from this model for fitNesse/selenium. These tools are used mainly for automation in agile. Scrum focal point is implementation. New and users preferred features are included in previous design by using iterative steps. They are known as sprints. When these sprints are included, they caused deprived and deficient requirements. As the consequences user feel trouble to using software. At some stage in sprints the next problem is continuous addition of new functions and their implementation. These problems are like latest functions are not harmful for existing ones. All the mentioned issues require automatic testing. For these problems authors [15] suggest this model based system. Suggested model is the extension of scrum. Enhancement made in two steps. One, design test design is more systemize by using old models which are used to store client requirements. In models notations like SD and IOD are used. A clear and proper interface for client created. Two, using proper tools that are FitNesse/Selenium execution of testing is automated. Actions of sprints are improved. Unlike other RAD techniques here are developers are along with testers. Both have different roles. Developers put sequence diagrams in an interface and implements it with clients needed functions. Testers make it more extended by using data of testing. They produced scripts of test that are executed automatically on the system. References [16-47] reviewed different techniques in different domains and reported their critical evaluations along with a workable framework where necessary.

3. Comparison of RAD Techniques

Every technique can be measured by its characteristic_that how it works in simple or normal way so obviously it will be not required much effort for programmer to develop and implement.

Ref #	Proposed model/technique	Area of Focus	Advantages	Limitations	Suggested Improvements
1	CBD model	Method that describes old components can be reused with new ones.	It provides reusability. It is cost effective. It has ease of use. Implementation is based on fewer steps. It takes laser time. It is more economic. Searching is much easy and efficient.	It is a simply prototype model. Not implemented yet. Not used practically. Having some security problems.	An operational model should be built up which will hold up CBD procedure model. It should be developed and tested in real environment.
2	RepoGuard which is a framework	Describes the ways to integrate tools with the help of source code repository.	It reduced the procedure of control. It also reduced steps in validation phase. It checks and makes changes before permanent storage. It gives a way to customers for the status of their processes. It gives information that either a process is successful or fail. Facilitates by introducing a communication channel between all customers. RepoGuard provides simple and much effective means to guarantee quality of software. Works well in distributed environment.	Good for simple validation. Not works on complicated design. Security problems. Good for small scale.	It can be explore further. Some additional steps and features can be added in it. Some modern features for example management of the files used for configuration should be maintained. A separate repository should be maintained. Flexibility in the system can be added.
3	A tool which is method based used in rapid software development.	Discussed ways of rapid software development by adding a layer in a model which also use Petri net and scrum features.	Less design work. Rapid software development. Speeds up components construction. Effective management Less effort needed. Productivity increased Team collaboration developed.	Useful for small scale. Not good for complex systems.	The proposed techniques can be explored more by adding features of agile.
4	Dynamic addition in agile	Techniques used to integrate in agile for making it more adaptable	Efficient. Speedy. Works in plane manner. Commercial.	Not easy. Much complicated. Not implemented	Platform can be explored more. Decoupling can be added in it. Some connectors

			Economical. Safe integration method. Dynamic. Rapid software development. Advanced methods used. Increase productivity. Enriched with functionalities. Apps can be add and remove without changing tool. User interface. Platform independent.	properly. Not works good on large scale. Difficult to handle. Difficult to manage. More expertise are needed. Complex method.	need to be used in practically. Searching apps and auto completion can be added. Much betterment can be made in this above discussed technique.
5	Framework for agile SOA development.	Discussed the ways of SOA with agile development and by joining them a new framework proposed.	It uses the agile method with SOA With the usage of agile it maximizes the speed of software development. As it follows SOA so it is compatible for changing applications. It helps to meet the changing requirements of the user. It reacts promptly to changing environments and makes deadline possible to meet. Makes product quality better.	It is a complex model. Attaining the advantages of agile along with SOA is difficult to achieve.	SCA parts granularity can be make better. Searched parts and their set outs policy should be enhanced.
6	Layer based method for rapid application development.	Layer based method that follows XP. Yield enhancement methods by using layered method.	Speed up software design work. Less design work needed. Easy development. It makes simple and uncomplicated ways which direct the development procedure according to client requirements.	Only suitable for small and medium size systems.	By making advancements it can be used in different areas like business level, information systems. It will help in business transactions as well.
7	Simulation based system design analysis.	development of a tools like agile on the basis of simulation system design	Plug in configuration is easy. Decreases the programming effort for system. User-friendly system design tools. For the simplification of	Involves extensive coding.	Tasks can be more simplify. By using UML behavior diagrams it can be described the preprocessing of the simulation results. OCL can also be

			tasks model-driven engineering can be used in it. Development is possible in parallel way.		used for mentioning the different dependencies.
8	Development of RAD in practically.	Development of RAD in practically and it implementation.	It manages application in an efficient and fast way. It automates the manual application process for the practical training system. It reduces the time duration of the application process. By using RAD technique it is suitable for small size of organization. By using this technique product/software can be developed and implemented in operational and running atmosphere in a shorter spam of time.	It is still not completed yet. It works better for only small size organizations. Clients are professionals so problems regarding to common user can not be identified properly. In feedback stage, problem takes place the same as practical difficulties occurs because of security trouble when the system tries to send email to organizations.	The proposed approach may be made robust by involving other participants such as coordinator in the development process.
9	Using Ajax in RAD	Using rapid prototyping in web application and tools.	Flexible to user requirements. Increases productivity. Open source. It gives novel tools. open source. it increases productivity.	Validation issue Not useful in large systems. Not helpful where subsystems need to be validated and secured.	No future work found.
10	Development of Multi-user applications in distributed environment rapidly.	Communication middleware.	Less time consuming. Allows fast and speedy ways of development. Allows fast and customized development. Helpful for both high and low level languages.	Not versatile. Not rich in functionalities. Works on only one server.	Model can be made adaptable by adding a middleware.
11	Xtreme programming	Adding reusability to XP	Quick feedback from the user side. Makes the complex domain knowledge simple for the developers. Provides a simple association with the customer. Easy and cost	It is not tested in real software development process. It required to tested and evaluated by user in some real software projects.	The possibility of integrating usability into xp needs to be explored.

			effective technique. Can be done in a rapid way. It makes the development simpler and serves the customer better.		
12	Rapid application development on multi-processor reconfigurable systems		Less time consuming. Cost effective. Optimize the design process by using predefined models. Makes design simple and better for reconfiguration. Hardware independent API.	Not really widely used today. Prohibitive design.	CAD tools can be used to automate software and hardware code generation.
13	Practical implications of RAD methodologies.	Some unforeseen practical implications of RAD are explored.	RAD don not have thorough and strict processes. It moves through the stages in an ad-hoc style and in incremental way. It is the working system which works in cooperation with the client. In it least credentials artifacts are used. Dealings with the customers are oral and unwritten. Customer's involvement is active in development procedure in this methodology.	RAD methodologies are not suitable for the large system development and systems that is complex in nature. In the absence of analyst in RAD developers deals with client which cause a confusion for client to understand their spoken technical terms.	Analyst should be added in team member for appropriate priority of function and non-functional requirements.
14	Software reuse	Software reuse, major contributions and unsolved problems were focused.	Used to build a bigger and complex systems. It is more reliable. A reduced amount of expense used. It makes sure delivery on fixed time.	Scalability problem arises when reuse is applied in large systems. To accomplish adequate formal specifications is difficult. Sustainability is also an issue in it.	Additional research is required on self-adaptive software. Need to explore ways for the reconfiguration of some context sensitive software.

4. Conclusion and Future Work

In this study, we have reviewed and analyze different RAD methodologies, techniques and related work. Using RAD methodology to develop software requires minimum planning for rapid prototyping. It consumes lesser time and produces quality software but that quality software is only suitable for small to medium size projects/systems. When RAD techniques are used for complex or large projects, it cannot gives required results and quality of system is compromised. It is considered that RAD is a cost effective approach, but on the other side security issues have been observed when reusability is applied on the existing components. So, one cannot simply compromise on the security. RAD facilitates rapid software development and makes sure delivery on fixed time. As RAD don not has thorough and strict processes so some practical implications were found during the literature survey. These implications are still unforeseen like conflicts in role and responsibilities among the team members, developers have power to take decision so their decision can be technology driven, and developers direct deal with users so ineffective communication problem occurs because developers often use professional terms which cannot be easily understand by a layman. Developers play the key role in implementing RAD techniques and their decision cannot be changed by other team members. Rapid delivery is the main point in RAD so there may be an omission or error during the development. In RAD implementation phase is important and developers change is continuous according to user's requirement. They believe that requirements are very difficult to explain individually so any system should be developed with the collaboration of users. Users take active participation in the software development process. After analysis of different approaches and researches related to RAD, we conclude that RAD is very suitable for only small to medium size projects. We cannot design all the systems by using RAD techniques because they heavily depend upon reusing the existing components; so it becomes easy for hackers to break the system and steal the formations. In short, there will be not variety and novelty in the software products. Up till now, all the methodologies of RAD like agile, scrum etc. are not free of the above described implications.

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