REDUCE THE INTERNAL AND EXTERNAL INTERRUPTIONS AND IMPROVING COMMUNICATIONS USING ENHANCED ADVANCED POMODORO TECHNIQUE IN AGILE SOFTWARE DEVELOPMENT

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Abstract: - Time Management plays a very important role in Software industry. Customer as well as company expected to deliver the software product in time to avoid so many problems like paying penalty to customer. Time management is not only depend on the peoples, it depends on hardware and software also. If there is any problem arises in software or hardware it could leads to delay delivery. There are so many technique are used in software industry to manage time, even though the users are still lagging in managing the time. So, they are introducing a new technique to manage time efficiently in agile software development called 'Pomodoro'. Pomodoro is a time management tool mainly developed for developers who is a team member of the agile team. By using this technique users can reduce the internal/ external disruptions and dramatically increases the productivity and user can increase the focus on our work. Nowadays users can get this tool as application in mobile and laptops for personal purposes.

Keywords:*EAPT – Enhanced Advanced Pomodoro Technique.*

I. INTRODUCTION

As the most of the industry in the world are runs by using the software, in each and every place software is very essential. Everywhere desktop and laptop are used, storing the data in database and the cloud are the best examples of emerging technology. Software industry is one of the main reason for emerging technology. As the software industries grows, each and every day a new software is release by a company or industry. So, there is a heavy rivalry between the companies to develop and deliver new software in market.

Delivering a new software at right time to market contribute profit to the company. A company should manage the time effectively to stay in the markets. So, time management plays a vital role in a company. It is one of the factor to decide the company's growth. Managing the time is not only followed by manager, it should be

followed by each team member or an employee of a company. Managing the time is very tedious task than wasting the time. Users can waste the time by chatting, gossiping, accessing social websites and roaming. By using enhanced pomodoro technique an employee can effectively focus on the work and managing the time efficiently.

The main objective of this research is avoiding the disruptions/ interruptions of an employee during working on the high complexity projects. A person can easily distract by chatting with colleagues and accessing the social websites, so it will be the one of the reason for delay completion of the project.

Pomodoro for Time Boxing

The PT is a time boxing strategy people can apply in any situation, e.g., homework, study, cleaning house, and indeed software development, spread out from the psychological notions of time elaborated by Bergson and Minkowski [3]. It was invented initially for individual work, but it was then applied especially by XP teams. This paper covers only this last case. The goal of the technique is to perceive time as a value ("I'm doing my best at a right rythm"), instead of an enemy ("I have not enough time; I'm late"). When the PT is applied, we observe that wasted time and overwork are drastically reduced, while the distinction between free time and work time becomes clearer .The individual comes to respect the value of time more, both free time and work time. The heart of the PT is to start a 45-minutes timer and then focus completely on one task until it rings; no email, instant messaging or any other distraction is allowed.

Daily work is defined as all the work that the agile development teams and their individual team members shall do within these mini-milestone cycles to produce a software increment that fulfills iteration goals. The mini-milestones are planned in advance and represented in an iteration plan. The concept daily work management shall be defined as all management and coordination practices that development teams and individual developers employ during these mini-milestones, including feedback tothe

iteration cycle. The goal of daily work management is to maximize these sustain able velocity at which the team and individual developers can produce value in the software increment during the iteration. This definition includes the refining of iteration plan, as it is considered to be feedback to the iteration cycle; however, it specifically excludes management decisions that change the scope of iteration or release; as these are considered belonging to the higher cycles instead.

II. EFFECTIVE WORK

Towards. A distraction may cause that the engineer makes a mistake, forgets the context or the debugged program times out and terminates itself. This can cause frustration and a nontrivial loss of time.

2.1.1 The Real Cost of Interruptions

Several studies [9, 17, 12, 13] have been done on interruptions and their impact on work. Various measures have been done including context of the interruptions, their frequency, impact on work efficiency, stress level, workload and effort. Other studies focus on the amount of productivity time wasted by these interruptions. In this section, I will mention several of these studies.

2.1.2 More Speed and Stress:

The study [9] was conducted on people answering to emails in their inbox as quickly, correctly and politely as possible. They were told that their "supervisor" is sitting in another room and will contact them regularly to ask questions either over telephone or IM2. The results of the study show, that when people are constantly interrupted, they develop a mode of working faster and producing less, to compensate for the time lost by the interruptions. However, this faster pace of work has its cost: higher workload and frustration, more stress, effort and time pressure. In conclusion, when being interrupted, the work can be done faster, but at a price. This study also shows that the context of the interruption to the currently performed task makes no difference or a very little difference.

The Cost of Not Paying Attention: This study [17] is focusing on the amount of time that interruptions waste. Data were gathered by observers in real offices, where these observers noted every single change of action of a knowledge worker3. Their findings are, that interruptions consume 28 % of the knowledge worker's day. Not all of these interruptions are unnecessary and considered as a waste of time. For example,

1. Helping a co-worker in a business-related matter is recognized as beneficial to the company's well being. Nevertheless, combining the unnecessary

interruptions and the time needed to switch context results in 503.52 hours per employee per year. The study also mentions

2. IM can refer to Instant Messenger or Instant Message, which is a text message sent using a service(messenger),that enables real time communication over the Internet.
3. A knowledge worker is anyone who works for a living at the tasks of developing or using knowledge.[15]

2. EFFECTIVE WORK

Resumption strategies for interrupted programming tasks: Another study [13] perform edon 10,000 recorded sessions of 86 programmers and surveyed 414 other programmers. The results say that resumption is a frequent and persistent problem. Only 10 % of the sessions have programming activity resumed in less than 1 minute and only 7 % of the programming sessions involve no navigation to other locations prior to resuming work. Actually, about 30 % of sessions took more than 30 minutes to restore the programming task.

2.1.3 Productivity Techniques

Internet, as well as libraries are full of books, papers and articles about work productivity. The proposed solutions vary from a set of simple rules to complex techniques. However, two of the techniques stand out, as they are promoted by a big user base – Pomodoro Technique [4] and Getting Things Done [1]. The Pomodoro Technique was created with the aim of using time as a valuable ally to accomplish what we want to do, the way.

- Enhance focus and concentration by cutting down on interruptions;
- Increase awareness of your decisions;
- Boost motivation and keep it constant;
- Bolster the determination to achieve your goals;
- Refine the estimation process, both in qualitative and quantitative terms;
- Improve your work or study process;
- Strengthen your determination to keep on applying yourself in the face of complex situations.

III. PREVIOUS IMPLEMENTATIONS
INTERNAL COMMUNICATION IN AN ORGANIZATION

In the section 3.1, we have already talked about quality as being a crucial aspect of communication. As it is the quality that we should focus on when establishing efficient internal communication, which can vary according to conditions. In [11], there are several principles that the project of altering a level of communication must assume:

1. Map the current situation in a meaning of describing the current state. Find its strengths and weaknesses, in order to know, what should be enhanced and what to be eliminated. Define opportunities and threats like technology, environment, current customs and specific employees. A SWOT analysis1 could be used for this purpose.

2. Make a specific description of the aim of the change. It is crucial to exactly know the definition of done, to be able to find the way to reach it.

3. Verify the aim and measure the improvement according to certain criteria in both short term and long term horizons. Sadly, according to [11], these projects usually fail due to insufficient support and/or competencies of the executive. Inconsistency among managers and their preference of other seemingly more important tasks also play their role, as results of such tasks appear more immediately and thus are more "lucrative" than a complex strategic task.

3.2 Importance of Ad-hoc Face-to-face Conversations in Agile

Environments Scott W. Ambler is a Senior Consulting Partner in a firm specialized in helping organizations to successfully adopt disciplined agile strategies. He has written several books and white papers on object-oriented software development, software processes, Disciplined Agile Delivery, Agile Scrum Model, Agile Model Driven Development, Agile Database Techniques and more, as he presents himself on his home page [3]. In most of his book sand papers, he pays a considerable amount of attention to communication, as it plays a significant role in every agile environment. Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds. These builds are provided in iterations.
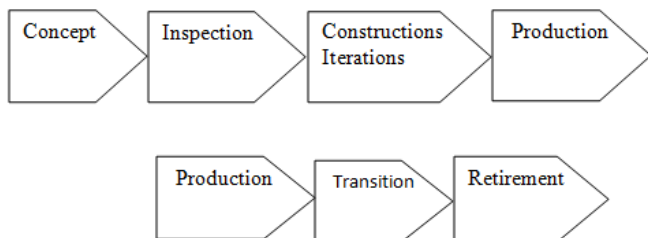

Fig 1: Agile Software Development Life Cycle

The Agile Process Flow

- Concept - Projects are envisioned and prioritized.
- Inception - Team members are identified, funding is put in place, and initial environments and requirements are discussed.

- Iteration/Construction - The development team works to deliver working software based on iteration requirements and feedback.
- Release - QA (Quality Assurance) testing, internal and external training, documentation development, and final release of the iteration into production.
- Production - Ongoing support of the software.
- Retirement - End-of-life activities, including customer notification and migration.

3.3 Pomodoro Technique

A Pomodoro is the interval of time spent working. After task completion, any time remaining in the pomodoro is devoted to overlearning. A short (3–5 minutes) rest separates consecutive pomodoros. Four pomodoros form a set. A longer (15–30 minute) rest is taken between sets.

Notification Tool

The notification tool may need to notify you when you have finished a Pomodoro. Originally, Pomodoro was invented to use with an analog tool called kitchen timer. On the other hand, the digital tool can be used. It is much more suitable for those who are working in front of computer. The tool allows user to adjust the block of times if it is not the default 25 minutes as same as break time. Figure 1 shows tools which can be used on PCs. Figure 2 indicates native application of Pomodoro which can be used on iOS platform

Fig 2: To Mighty Application on Mac

Record The Pomodoro

In order to get useful information to analyze in the future, you may need to keep recording the history of a Pomodoro. Developer experimented by using paper to record it. Note it down whenever internal/external interruptions occur by using his/her own code to distinguish interruptions. Interruptions are categorized as codes as follows: I is internal interruption E is external

interruption Moreover, interruption can be organized into sub category which is useful to distinguish more clearly.

The concept of the Pomodoro Technique helps people to improve their focus and productivity. However, after using it for a period of time. Developer may notice the limitation of it. For example, for some tasks require a block of time to focus continually which cannot be broken down into smaller task. Developer may already have a deep focus during his/her Pomodoro. When a block of time is finished. By concept, he/she needs to stop it right away. Sometimes, this is an interruption in the bigger point of view. Developer is allowed to adapt the Pomodoro Technique based on his/her habit. From the experiment, in order to work with complex tasks require time and deep understanding. Developer may extend his/her Pomodoro by ignoring the notification alarm. AEV is used to indicate as an extended Pomodoro which produces a void Pomodoro.

IV. PROPOSED ANALYSIS

Enhanced Advanced Pomodoro Technique (EAPT) is the leading concept of Advanced Pomodoro Technique. EAPT overcome the drawbacks of the advanced pomodoro technique which it mainly affects the principle of the agile. They are, daily co-operation between business people and developers and face-to-face conversation is the best form of communication (co-location). In order to improve the communication between the team members as well as the user have to enhance the functionality of advanced pomodoro by implementing EAPT for all team members not only for developers. This will achieve more communications between team members and they can deliver the project earlier if the entire team member uses this technique and blocking social websites can increase the productivity without getting distractions by social websites.

EAPT

Enhanced Advanced Pomodoro Technique should implement in all the team member's working machine whose are agile team members. Each and every user story having different level of complexities, each story may have low, medium and high complexity. This technique they mainly used for high complexity stories because high complexity stories takes a lot of time to work.

Process of EAPT

The overall process of EAPT is based on time. In early, Advanced Pomodoro has 25 minutes of work and 5 minutes of break. In EAPT, total allocation of time is 45 minutes, 10 minutes for discussion, 30 minutes for work and 5 minutes for break.

Execution on Pomodoro

Before starting to work on pomodoro, the team member should provide the details about the story like story id, project id which is going to work on pomodoro. Once those detail are provided, the team member can start to work on pomodoro by click the start button. Once the Pomodoro button is clicked, it provides 2 options i.e., whether they want to discuss with the team members or not they want to work on the story. If they want to communicate they can proceed by selecting the option 'Start' else they select start to working on the story.

Alert Mechanism

This mechanism alerts the team member in 3 ways:

- When a team member start to work on pomodoro, they can discuss with the team for first 10 minutes, after the completion of 10 minutes the alert mechanism provide beep sound or alarm sound to notifies that they utilize 10 minutes for discussion.
- When a team member start to work on a story when they don't want to communicate with the team member, the alert mechanism provide the beep sound or alarm sound when the time reaches 30 minutes for taking break or having discussion with the team members for next 15 minutes.
- When a team member start to work on a story when they want to communicate with the team member for first 10 minutes after the completion of 10 minutes the alert mechanism provide beep sound or alarm sound to notifies that they utilize 10 minutes for discussion, then they can start to work on story for next 30 minutes. After the completion of 30 minutes again the alert mechanism provide the beep sound or alarm sound for to take break for next 5 minutes.
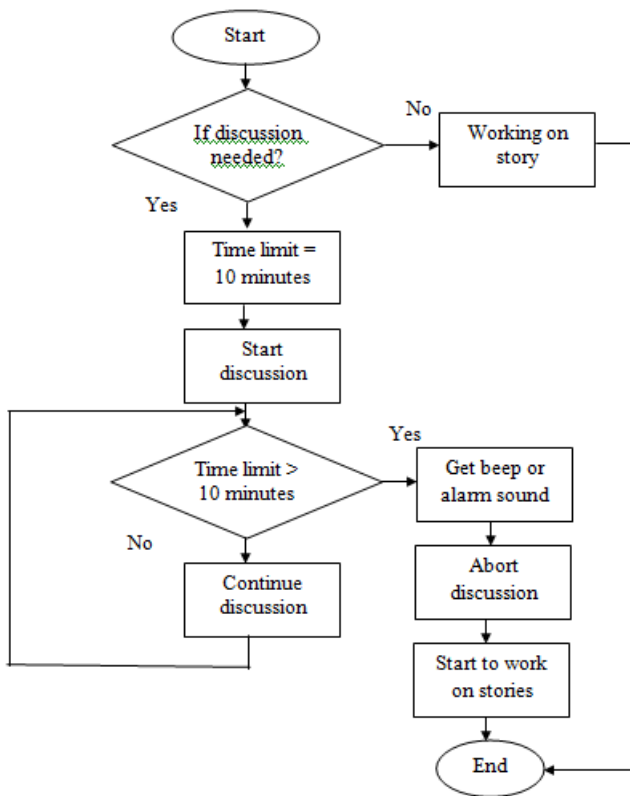
Fig 3: Flow Chart of EAPT – Communication with Team Members

V. EVALUATION RESULT

This section presents the experimental results based on various sprints assessment metrics for efficient time management. The table 6.1 shows the experimental result of proposed techniques, here different sprints are used by the developer, tester for the same story with the different complexity because a story can develop easily but tester have to perform various of testing for that story, so the complexity will be differ for the developer and the tester. The proposed technique shows that the developer or a tester can complete their work within the minimal amount of time as well as it improves the focus on the work and having proper communication with the colleagues without having deviation from their work. This means this technique produces more focus and increases the communication when compared to existing system.

The proposed technique enhanced advanced pomodoro technique is implemented with the additional features. Developer or Tester or any technical specialists who is working on pomodoro having two options. i.e., if they want to communicate before entering into pomodoro, they can perform by click the communication start button if they don't want they can start with the pomodoro by click start button. Communication time and pomodoro time will automatically save in the database. So, the

product owner can track their employee actual working hours and estimated hours of a particular complex story.
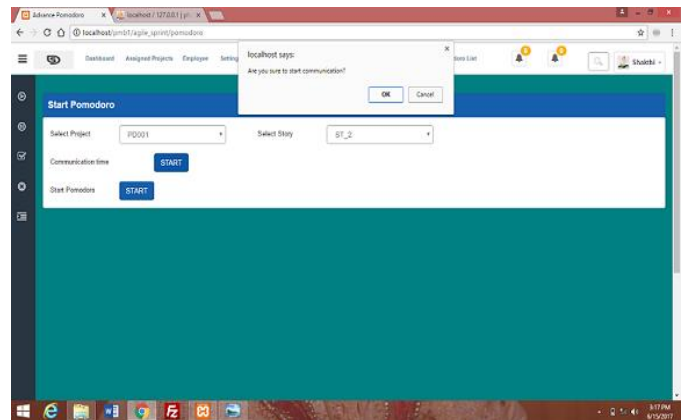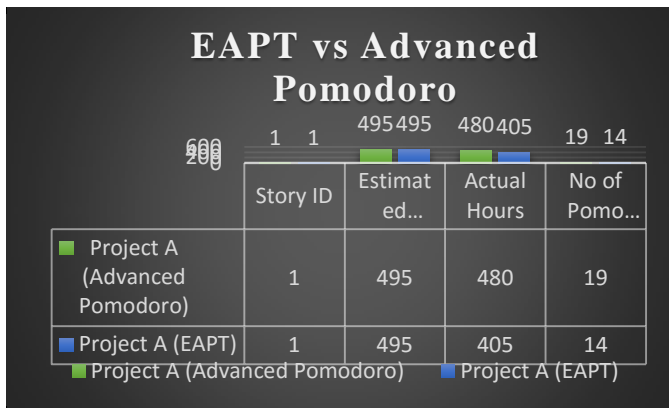

Fig 4: Start Communication with Colleague

In Database the user can reserved the number of working hours on a particular story, how many pomodoros they are working and how much hours they are utilizing for discussion. These details that can be viewed by product owner of the story as well as the user. With the help of these details the product owner can track the working hours of an employee.

Fig 5: Reserved the Data in Database

Company A works on Project A with two different technique such as Advanced Pomodoro and EAPT in order to compare the actual completion time of a project. Total estimation time of Project A is 490 hours. When the user works on Project A by using Advanced Pomodoro they can complete the project by 480 hours with the help of 19 pomodoros. The same project can be completed by 405 hours with the help of 14 pomodoros. So, they can conclude that when compare to Advanced Pomodoro,

EAPT vs Advanced Pomodoro

	Story ID	Estimated...	Actual Hours	No of Pomo...
■ Project A (Advanced Pomodoro)	1	495	480	19
■ Project A (EAPT)	1	495	405	14

■ Project A (Advanced Pomodoro)   ■ Project A (EAPT)

CONCLUSION

Today software industry follows so many technique and tools for preventing delay delivery, but still they are still struggling for delivering the project at right time. Software industry follows many models to develop a project but nowadays they are switched over to agile model. Agile Model supports different principles when compared to other models. In Agile model, delivery on expected date should be very important because based on the result of the sprint they can go ahead with the next sprint, if its not delivery at right time the subsequent sprints will get delay as well as if there is any changes in the current sprint they have to be modified as early as possible and it should not affect the subsequent sprints.In this paper, it focus on how the user can concentrate on work, improve the productivity and avoid delay delivery due to internal and external disruptions. Internal disruptions occur due to self-distractions such as speaking through phone, accessing social websites, gossiping with colleagues. External disruptions such as office meeting, discussion with the team members / project manager.

FUTURE WORK

The proposed technique is effective for managing the time in agile methodology. So the future scope for the proposed method is status technique, in that it shows the status will be in on mode when the developer or tester or technical specialists working on pomodoro, the status will be in off mode when developer or tester or technical specialists not working on the pomodoro. So, it will avoid any interruptions from other team members by seeing their status.

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