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Enhancing The Development Of Agile Software Via A Proposed Scrum Model

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Abstract :In the current study, the proposed CESP process will have global project view that will help to eliminate waste of resources in those earlier stages by rearranging the tasks that will required in earlier stages. Hence, reduces the overall projects time and cost. All that while maintaining the agility and flexibility desired by adopting the Agile methodology. The main objective of our paper is reduces the overall projects time and cost. All that while maintaining the agility and flexibility desired by adopting the agile methodology.

1. INTRODUCTION

In the past decade, there has been a shift away from traditional software methodologies. As many people found that the overheads imposed by traditional methods such as the waterfall model, the standard process, etc., slowed down the development process and did not achieve the required quality [1-3]. Adopting Agile methodologies or any of its framework emphasize the project correct requirement execution which leads to less efficient development [4, 5]. In this research we devised a frame work that combine the quality, flexibility and precision of the Agile process with the efficiency of developing projects with less waste of resources.(Abdul Jalil et al., 2021; Mohd Noh et al., 2021; Mustafa et al., 2021; Roszi et al., 2021; Tumisah et al., 2021). If it is managed well, various problems can be avoided (Irma et al., 2021; Suzana et al., 2021; Rohanida et al., 2021; Nazrah et al., 2021; Shahrulliza et al., 2021).

All aspects require effective leadership and management (Mohd Arafat et al., 2021; Sumaiyah et al., 2021; Hifzan et al., 2021; Shahrul et al., 2021; Helme et al., 2021).
The success of something depends on good and efficient management (Mohd Ali et al., 2021; Parimala et al., 2021; Siti Jamilah et al., 2021; Nor Fauziyana et al., 2021; Noel et al., 2021).
The best way is to do efficient management (Ahmad Shafarin et al., 2021; Junaidah et al., 2021; Farah Adibah et al., 2021; Ahmad Shakani et al., 2021; Muhamad Amin et al., 2021).
This demonstrates that the importance of something being managed well (Santibuana et al., 2021; Nor Diana et al., 2021; Zarina et al., 2021; Khairul et al., 2021; Rohani et al., 2021; Badaruddin et al. , 2021, Abdul Rasid et al., 2021)

2. METHODOLOGY

The project simulation phase
In this phase the project team will engage in simulating a modified scrum process for the project development until the end of the project. The development team will negotiate with

the product owner a set of deliveries. A precise set of requirements will be attached for each delivery. The CESP tool will produce a set of sprints for each delivery.Then, the development team will decompose each delivery requirement into tasks. For each task, the team will determine the skill needed, the estimated effort and the tasks it depends on. Record all these data in the CESP tool, which in turn will construct the lattice of all project tasks dependencies.Starting from a single sprint for the delivery, the tool will add tasks to the latest delivery sprint, the chosen task will be from the lattice such that all other tasks it depend upon (if any) are already in this sprint or earlier sprints. When a task caused that sprint to exceed its capacity in any skill type, a new sprint is created and repeated the process until no task exist in the delivery Backlog and repeated for all deliveries.Finally, the CESP tool will produce a set of deliveries each delivery is assigned a number of sprints, each sprint is assigned a number of tasks, and each task is assigned a skill and the estimated m/h needed for the task.

The optimization phase

This phase will involve the scrum team and the scrum master using the CESP tool. The objective of this phase is to move those tasks that can be moved to earlier sprints provided that there was some free resources available that was not fully utilized in that earlier sprints.The CESP tool will rearrange those tasks and present the suggested change pending approval from the development team. Compute the saving per project, if any, resulting from the new change and iterate until there is no more optimization possible.After that we fill up the tasks with sprints that do not depend on other tasks. Tasks that depend on tasks don in existence sprint or earlier sprints.

1- For each skill capacity in earlier sprint that exist, Search for task in later sprints that can use the available capacity if and only if its meet the dependencies required.

2- If there is a task that serves more than one delivery, we assign it to the nearest earlier eligible delivery.

3- For each change made adjust it’s the sprint critical path and adjust the sprint end date and all later sprints started and finished date.

4- Repeated until there is no more optimization can be done.

5- Computer the overall cost in term of M/H of the whole project and report the change of the whole cost compared with the original cost.

6- If there is a human resource that is no longer needed for the development, it will be removed from the project hence decrease the cost of the development.

By the end of this phase the CESP will produce: sprints backlog composed of series of sprints, A sprint backlog, which is composed of a set of tasks that is contain of the current sprint, and an initial project plan that will show all tasks tell the end of the project hence allow the project manager to have a clear budget and monitor the execution of the whole project it term of cost and time.

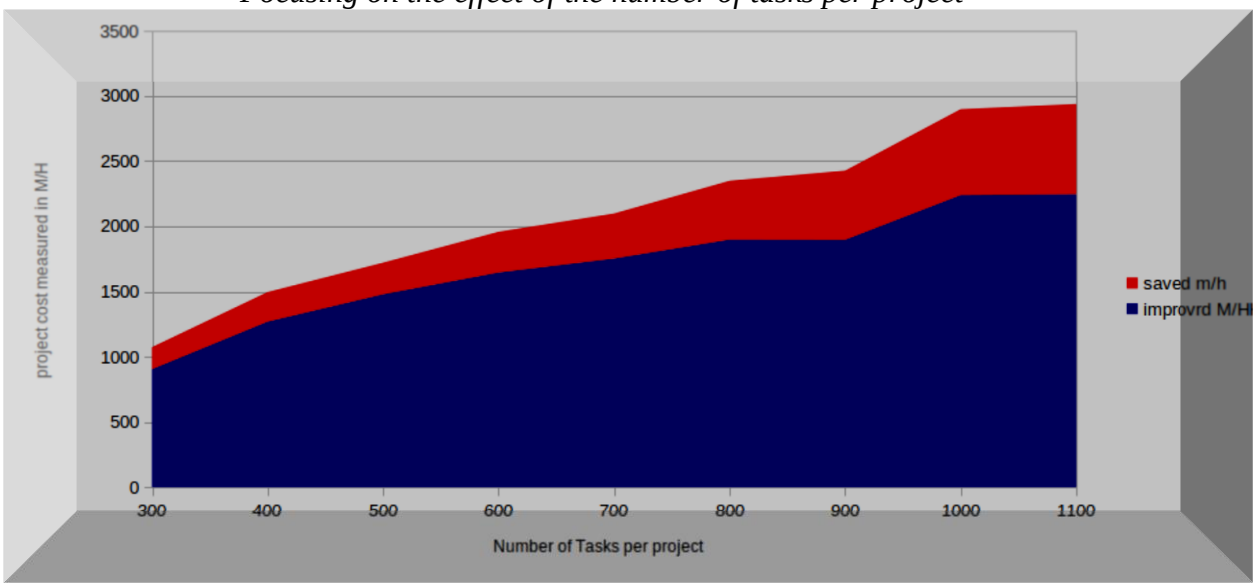
The Scrum Activation phase

In the phase the normal scrum process will be followed with only minor changes. There might be some changes to the project plan such as adding new requirements, changes to current requirements, bug fixes or delay in any task execution for any reason may backlog refinement. Any such change will be done using the CESP tool to compute the effect of the change on the current sprint and latter sprints and the deliveries date and consequently on the overall cost of the project.

3. RESULTS AND DISCUSSION

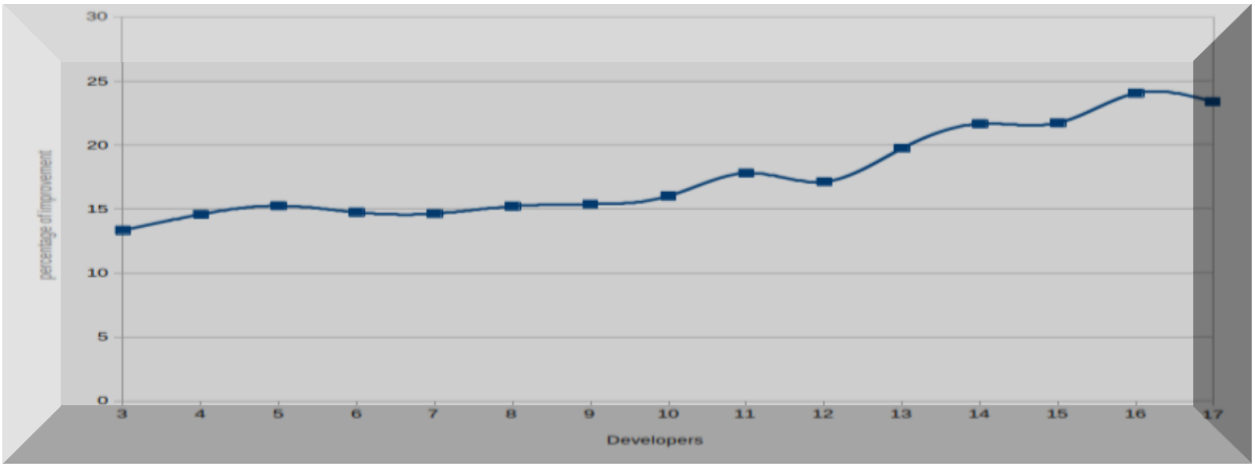
A number 2000 projects data were produced randomly according to different agile benchmarks. The normal scrum methodology of assigning requirements tasks was then applied to each sprint. The applied CESP methodology with the holistic project approach using its 3 phases and collected the results for comparison.The experiment is conducted on a set of 2000 projects with data generated according to the benchmark. The average overall performance enhancement due to applying the use of the CESP is 17.42% which mean that the average cost per project has decreased by 17.42% for all 2000 projects tested and optimized.In turn, there was the analysis of the effect of changes in each parameter and its effect on the cost of the development of the project.

Focusing on the effect of the number of tasks per project



The figure shows the optimized cost and the saved cost for projects with different number of tasks. And it is apparent that the decrease of cost is consistent for different project sizes in terms of the number of the overall tasks. The red area represents the saved M/H the blue are represent the cost of the project after applying the CESP optimization. The sum of the blue and the red area represent the original cost of the projects of different sizes (number of tasks per project.)

In Relation to the effect of the change of the number developersper project



This figure shows the relationship between the number of developers per project and the enhancement due to the use of CESP. Clearly it shows that the more developer available the more enhancement we get. That is due to the fact that the more developers exist in a project the chances the waste of resources occurs. Consequently, the more waste of resources exist in normal scrum process the more chances that the CESP will be able to use this waste of resources hence fill up the earlier sprints with tasks moving many tasks earlier which will reduce the project time hence reduce time and cost.

Regarding the effect of increasing the direct dependent tasks

The direct dependent task is defined as the maximum number of tasks each task of the project will be allowed to be dependent upon. As a result, the bigger the number of direct dependent tasks the wider and shallower the dependencies lattice. Also, the less the number of direct dependencies the narrower (and deeper) the dependencies lattice was.This figure shows the decrease of cost related to the maximum number of dependent tasks for every task. It is clear that the performance enhanced when the number of dependent tasks is decreased. After careful examination we have found that the reason is that the more dependent tasks per every task the more likely that the chain of dependent tasks is longer. Hence it is harder or may be impossible to fit in earlier sprints that will reduce the chances for real improvement in time and cost. When the maximum number of direct sub-tasks decreased the string of dependent tasks becomes shorter that ease packing them into earlier sprints hence improving the usage of resources and decreases time and cost.

In the proposed Manuscript Architect system, the aim is to ensure the simplification of the scientific writing process. Thus, writing is divided into processes such as translation facilitation when the target audience uses a different language from that in which the manuscript is written, text block consistency, text block connection, text block hierarchical order establishment, and text block or main concept listing. Thus, a Web-based tool is built to ensure that virtual groups, through asynchronous and synchronous methods, work on scientific manuscripts.

In the proposed system, JAVA language is used. Also, a classic lifecycle development technique is selected and involves the use of prototyping methods to analyze and specify pre-requisites, unit testing and implementation, system testing and integration, and maintenance and operation. The system also comes with two separate portions in its interface. On the one hand, the left portion constitutes hierarchical trees, with the order of appearance used to display text blocks. For instance, therefore, colors are used to identify the title of each text. In

particular, green implies that a text block has come from a co-author and reached the primary author while red implies that a text block is assigned. For the right portion, of the proposed Manuscript Architect application, it operates in such a way that the owners of a text block can edit it after accessing the available editing tools. Thus, the proposed system seeks to ensure that from the side of the primary authors, they could revoke text blocks as deemed appropriate, especially because they exhibit the text block ownership.

In summary, this study has established that Web applications seeking to steer improvements in the writing process in a systematic way are limited. In this study, an application seeking to separate various tasks concerning scientific writing to obtain smaller components is proposed. The study's specific objective is to offer a mechanism in which sections of any given text book could be assigned to various specialists. Therefore, a classic lifecycle development technique and Java language aided in manuscript architect building. To achieve the economy and simplicity of movements, there was the design of an interface. Through formal field observations and usability tests, there was the evaluation of system usability. In the findings, it was discovered that the proposed system yields excellent integration and usability with other experienced researchers' writing habits. In summary, the proposed manuscript architect was found to be promising in terms of scientific text preparation. The eventual conclusion was that in situations requiring interdisciplinary work, scientific writing through virtual writing is effective.

Overall, the bigger and more sophisticated the project the more reduction of cost we achieve using the CESP methodology. If we have a small project with few developers and few requirements using the CESP will not enhance the project efficiency over the normal Scrum process in fact it will be exactly the normal Scrum process if, for example we have one skill needed for the whole project, or if we have no dependencies among tasks. It is strongly advised to use the VESP process if the project has many developers with a large variety of skills. Such projects probably have a large number of tasks and Sprints.

4. CONCLUSION

By emphasizing the planning for the whole project prior to any development and simulate the scrum process for the whole project putting into consideration the availability of the resources throughout the development phases, it was possible to devise a methodology that keep the agility and flexibility of the scrum processes while having a precise view of the development of the project. The methodology improves the efficiency of agile software development and it help to overcome the weaknesses of the previous methodologies and comprises all their strengths together. The validation of the proposed methodology has shown that an expected 20% reduction of cost of projects on average.Another result of the study is the feasibility of using the given tool as a back office for lean methods.

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