



Web-Based Time and Productivity Analysis using Work Breakdown Structure and Agile Methodology

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ABSTRACT:

Effective time management is crucial for the success of software development projects. This article proposes a comprehensive method designed to optimize the allocation and tracking of time resources throughout the software development life cycle. The proposed method aims to calculate and manage time spent on various project activities, ensuring efficient programming of tasks and activities. The method presented in these abstracts addresses the unique challenges faced in software development projects by providing a structured framework for time allocation. By systematically tracking and managing time, development teams can gain insights into resource utilization, identify potential bottlenecks, and make informed decisions to enhance overall project efficiency.

I. INTRODUCTION:

In the dynamic landscape of our contemporary lives, where the pace of each passing moment holds the potential for both progress and challenge, the mastery of time management emerges as an indispensable skill. Time, an elusive and intangible resource, acts as the silent orchestrator, governing the rhythm of our daily pursuits and shaping the intricate narrative of our personal and professional journeys. This introduction invites you to embark on a transformative journey into the world of time management, a realm where significance, challenges, and the power to effect profound change converge on the tapestry of our lives.

The Essence of Time: In the grand symphony of existence, time stands as an invaluable asset, both finite and irreplaceable. Its scarcity prompts us to contemplate its optimal utilization, instigating a compelling need for effective time management. As we navigate the intricate tapestry woven by our commitments, aspirations, and obligations, the ability to harness time emerges as a linchpin for success and fulfillment. Each moment becomes a precious resource, waiting to be channeled with purpose and intentionality.

Challenges in the Temporal Realm: The modern era presents us with a paradox—technological advancements promise increased efficiency, yet the accelerating pace of life poses unprecedented challenges in managing our time. Distractions abound, and the ever-expanding array of tasks and responsibilities can create a landscape of overwhelming complexity. In this temporal realm, strategic time allocation becomes not just a luxury but a pressing necessity, demanding a nuanced approach to balance amidst the hustle and bustle.

The Power of Time Management: Beyond the realm of more efficiency, effective time management holds the transformative key to unlocking both personal and professional potential. It empowers individuals to not only navigate the complexities of their daily lives but also to prioritize tasks, set achievable goals, and cultivate a profound sense of balance amid life's multifaceted demands. Whether in pursuit of career milestones, personal growth, or moments of leisure, the judicious use of time becomes the catalyst for realizing aspirations and crafting a life of purpose.

As we embark on this exploration of time management, the journey calls us to delve into the principles, strategies, and real-world applications that empower us to master the flow of time. This expedition invites us to cultivate a harmonious relationship with time, providing the tools to navigate the sands of our days with purpose, resilience, and the unwavering assurance that each moment is a canvas awaiting the strokes of intention and accomplishment. Together, let us unravel the mysteries of time, transforming it from an abstract concept into a tangible force that propels us toward a future defined by our deliberate choices and meaningful achievements.

II. REVIEW OF RELATED LITERATURE

A. TIME MANAGEMENT FOR PERCEPTIONS IN SOFTWARE TEAMS

In software development environments, the effective management of time in the context of perceptions within teams has emerged as a critical challenge. Software teams, driven by the dynamic nature of the industry and evolving user expectations, often struggle to balance efficient time utilization with the

need to maintain a comprehensive and accurate perception of the product under development. The confluence of rapid technological advancements, shifting market demands, and the inherent complexity of software projects present a multifaceted problem that demands immediate attention.

- Ensure a more accurate alignment of internal team perceptions with external stakeholder expectations by implementing transparent communication channels and regular feedback mechanisms.
- Develop and implement a prioritization matrix that aids teams in setting clear goals and prioritizing tasks based on their impact on product perception and overall project success.
- Improve the accuracy of time estimates for project tasks by implementing reliable time estimation techniques, fostering collaboration among team members, and continuously refining estimation processes.
- Implement transparent communication protocols, including regular stand-up meetings, sprint reviews, and retrospectives, to ensure that all team members have a shared understanding of project goals, timelines, and challenges.

B. Optimization and Time Management of Weekly Class Schedule

Many students face challenges in optimizing and effectively managing their weekly class schedules, leading to issues such as missed deadlines, increased stress, and reduced overall productivity. The lack of a structured approach to time management often results in a suboptimal balance between academic commitments, extracurricular activities, and personal well-being.

- **Linear Programming and its Application to Scheduling and Time Management:**

Linear programming (LP) optimization has been known to be applied in many different fields, such as in manufacturing, food distribution, and renewable energy among other systems. The case successfully compared conventional approaches to the proposed novel approach of LP. Moving forward, it can be seen how LP can benefit many operations concerned with scheduling optimization. Therefore, it may be initially inferred that LP can also benefit personal scheduling for academic time management and productivity.

- **Prioritization and Task Management:**
 - students to identify and prioritize Enable tasks effectively.
- **Effective Schedule Planning:**
 - Assist students in creating well-balanced weekly schedules that include dedicated study sessions, breaks, and extracurricular activities.
- **Digital Tools and Technology Integration:**
 - Encourage the use of digital planners, calendar apps, and productivity tools to streamline workflow and enhance organization.
- **Optimized Productivity:**
 - Educate students on the detrimental effects of multitasking and promote strategies for focused work.

C. Evolving Time-Management-Based Prediction for Quality Criteria in a Multi-stage Production Process

In a complex multi-stage production process, maintaining high-quality output is crucial for meeting customer expectations and industry standards. One of the key challenges in this context is predicting and managing the time required for each stage of production to ensure the final product's quality.

- Enhance Production Efficiency:
- Optimize Resource Utilization:
- Improve Quality Criteria Prediction:
- Mitigate Production Delays:
- Adapt to Dynamic Environmental Factors:
- Facilitate Cross-Stage Collaboration:
- Enable Real-Time Monitoring and Feedback

D. Time management method for software development projects

The article aims to propose a method that calculates the time spent on a software development project and provides effective programming of activities.

- The objectives of the article are to propose a method for project time estimation and effective management in software development projects.
- The article aims to define inputs, activities, tools, roles, and output artifacts for each phase, allowing for the calculation of time in each phase.
- The article emphasizes the importance of effective project management in achieving project objectives within budget and estimated time.

E. Improved Management of Issue Dependencies in Issue Trackers of Large Collaborative Projects

The problem statement of this article is to provide solutions for better management of dependent issues in issue trackers, specifically in the context of large collaborative projects. The study aims to address the challenges faced by software project stakeholders in managing issue dependencies over the development life cycle and to provide concrete examples and theoretical models for the practical application of features that support issue management tasks.

The article presents three objectives for the proposed solution to improve dependency management in issue trackers:

- Users gain a better understanding of the existing issue dependency network of the issues.
- Users can search for missing dependencies and unidentified duplicate issues.
- Users can check the correct release assignments and priorities of the issue dependency network of issues and receive suggestions for resolving inconsistencies.

F. Effect of Project Management in Requirements Engineering and Requirements Change Management Processes for Global Software Development

The problem statement of this article is to investigate the effect of project management on requirements engineering and requirements change management processes in global software development (GSD). The study aims to identify the challenges and issues faced in these processes and propose frameworks to address them.

The objectives of the article are to investigate the effect of project management on requirements engineering and requirements change management processes in global software development. The article aims to analyse the impact of project management practices on the success of software projects and to propose frameworks for improving communication and managing requirements changes in global software development.

III. METHODOLOGY

Effective web-based time productivity analysis involves the use of various methods and tools to ensure that tasks are completed on time and within the allocated resources.

Here are some proposed methods used in web-based time productivity analysis:

A. Work Breakdown Structure (WBS):

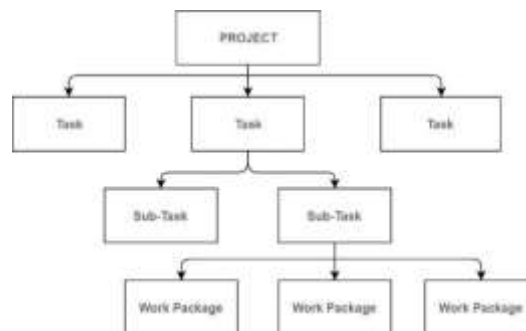


Fig2.1 Levels of the work breakdown structure

The Work Breakdown Structure (WBS) is a hierarchical decomposition of the total scope of work to be carried out by the project team. It breaks down the project into smaller, more manageable components, making it easier to plan, execute, and control.

From the above figure (Fig2.1)

- **Task Identification:** Break down the entire project into distinct tasks and sub-tasks. This process involves identifying all the work that needs to be accomplished to complete the project.
- **Hierarchy Creation:** Organize tasks in a hierarchical structure. The highest level represents the overall project, and subsequent levels break down tasks into more detailed components.
- **Resource Allocation:** Assign resources (human, financial, and material) to each task. This step helps in understanding the resources required for each component of the project.
- **Time Estimation:** Estimate the time required to complete each task. This involves forecasting the duration for each component based on historical data, expert judgment, or other estimation techniques.

- **Dependency Identification:** Determine the dependencies between tasks. Understand which tasks are dependent on others and establish the sequence in which they need to be completed.
- **Milestone Definition:** Identify key milestones within the WBS. Milestones mark significant points in the project timeline and help in tracking progress.
- **Task Ownership and Responsibility:** Assign ownership and responsibility for each task. Clearly define who is responsible for the completion of specific components.
- **Scope Verification:** Use the WBS to verify that all project requirements are addressed. This ensures that nothing is overlooked during the planning phase.
- **Project Visualization:** Provide a visual representation of the project structure. This visualization aids in communication and understanding among team members, stakeholders, and project managers.
- **Change Management:** Use the WBS as a reference point for change management. When changes occur, assess their impact on the WBS and adjust accordingly.
- **Monitoring and Reporting:** Use the WBS as a basis for monitoring and reporting project progress. Regularly review completed tasks and assess their impact on the overall project timeline.
- **Continuous Improvement:** Learn from the project experience and continuously improve the WBS for future projects. Lessons learned during the execution phase can inform adjustments to the WBS structure for enhanced efficiency in subsequent projects.

B. Gantt Charts:

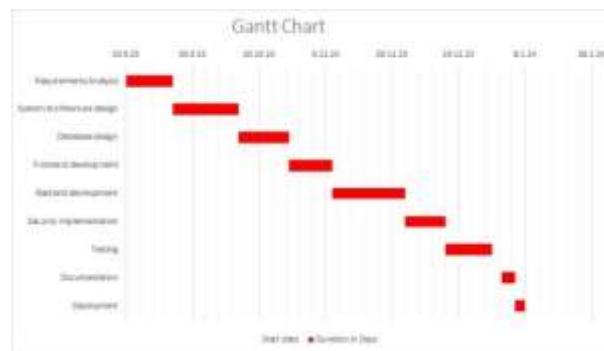


Fig2.2 Grant chart displaying the project status

From the above figure (Fig2.2)

Gantt charts are visual representations of project schedules that display tasks over time. Each task is represented as a horizontal bar on the chart, with its length corresponding to the duration of the task. Dependencies between tasks are often indicated by arrows.

- **Task Scheduling:** Break down the project into tasks and allocate specific timeframes for each task on the Gantt chart. Ensure that tasks are logically ordered, and dependencies are accurately reflected.
- **Resource Allocation:** Assign resources (human, material, etc.) to each task on the Gantt chart. Avoid resource conflicts by carefully managing workloads and availability.
- **Milestone Tracking:** Use Gantt charts to identify and mark project milestones. Milestones serve as significant points of progress and help track overall project advancement.
- **Critical Path Analysis:** Identify the critical path—the sequence of tasks that must be completed on time for the project to stay on schedule. Focus on tasks along the critical path to prevent delays in the overall project timeline.
- **Progress Monitoring:** Regularly update the Gantt chart to reflect the actual progress of tasks. Compare planned vs. actual timelines to identify discrepancies and take corrective actions.
- **Communication Tool:** Share the Gantt chart with the project team to enhance communication. Ensure team members are aware of their tasks, deadlines, and overall project timeline.
- **Scenario Planning:** Use Gantt charts for scenario planning by adjusting task durations or dependencies. Evaluate the impact of changes on the overall project timeline and make informed decisions.
- **Resource Levelling:** Optimize resource utilization by smoothing out resource peaks and valleys. Adjust task assignments on the Gantt chart to create a more balanced workload.

- **Dependencies and Constraints Management:** Clearly define task dependencies and constraints on the Gantt chart. Regularly review and update these dependencies to reflect changes in the project plan.
- **Baseline Establishment:** Establish a baseline Gantt chart at the beginning of the project. Use this baseline for comparison throughout the project to assess deviations from the original plan.
- **Collaborative Editing:** Use collaborative project management tools that allow multiple team members to edit and update the Gantt chart in real-time. Enhances teamwork and ensures that everyone has access to the latest project schedule.

C. Agile Project Management:



Fig2.3 Phases of the Agile Methodology

From the above figure (Fig2.3)

Agile Project Management is a widely adopted methodology for managing projects, particularly in the realm of software development. Here are some key aspects and methods associated with Agile Project Management:

- **Scrum:** Scrum is one of the most popular frameworks within Agile. It divides the project into small, iterative cycles called sprints, usually lasting 2-4 weeks.
- **Key Practices:** Sprint Planning: Plan tasks for the upcoming sprint.
- **Daily Stand-ups:** Brief team meetings to discuss progress and plan for the day.
- **Sprint Review:** Evaluate the completed work at the end of each sprint.
- **Retrospective:** Reflect on the sprint and identify areas for improvement.
- **Visualizing Work:** Using a Kanban board to display tasks and their statuses.
- **Work in Progress (WIP) Limits:** Setting limits on the number of tasks in progress to optimize workflow.
- **Continuous Delivery:** Encouraging a steady flow of work from start to finish.
- **Collaborative Work:** Encouraging constant communication and collaboration among team members.
- **Planning Poker:** A consensus-based technique for estimating work items.
- **Relative Sizing:** Comparing the sizes of tasks rather than providing absolute estimates.
- **Adaptive Planning Meetings:** Regularly reviewing and adapting project plans based on feedback and changes.

IV. RESULT

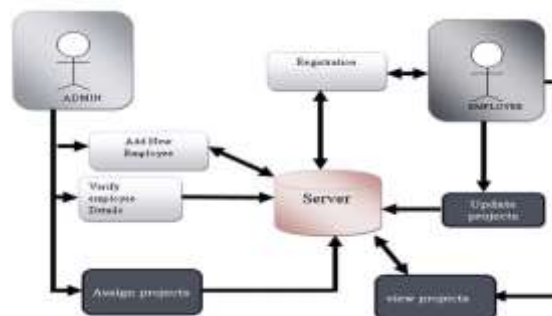


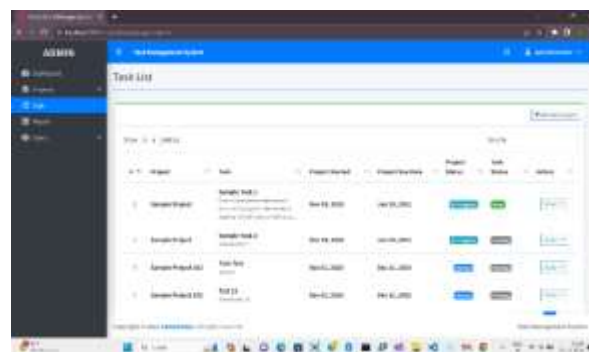
Fig4.1 Architectural diagram of time management System

From the above figure (Fig4.1)

Admin Panel

- **Secure Login and Logout**
- **Dashboard**
 - Display the summary of lists
- **Employee Management**
 - Add New Employee
 - List All Employees
 - View Employee Details
 - Update Employee Details
 - Delete Employee Details
- **Project Management**
 - Add New Project
 - List All Projects
 - View Project Details
 - Update Project Details
 - List Project's Employees Report List
 - Overwrite Employee Report
 - Delete Employees Report
 - Close Project
 - Delete Project Record
- **Reports**
 - Employee Time Allotted Per Project
 - Print Reports
- **Manage User List (CRUD)**
- **Manage Account Details/Credentials**

Fig4.2 Dashboard of Administrator



Employee-Side

- **Secure Login and Logout**
- **Project Management**

- List All Project
- Add New Report Per Project
- View Project Details
- List Reports on Project
- Update Report
- Delete Report
- **Reports**
 - Time Allotted Per Project
 - Print Reports
- **Manage Account Details/Credentials**

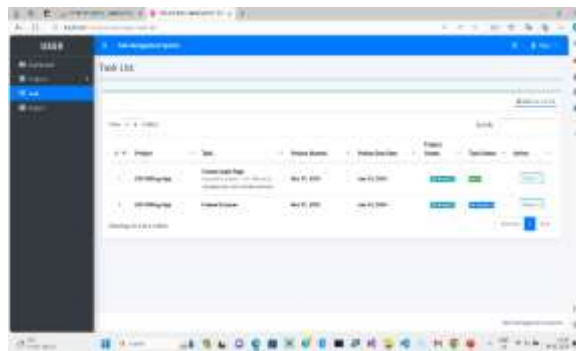


Fig4.3 Dashboard of User

The Time Management Project aims to provide users with a robust tool for scheduling and organizing their tasks efficiently. Users can create, update, and delete tasks, set deadlines, and receive reminders.

From the above figures (Fig4.1 and Fig4.3)

By employing this proposed method, the Time Management Project aims to leverage PHP, XAMPP, WAMP, HTML, MySQL database, and JavaScript to provide users with a powerful and intuitive tool for effective time management. The combination of server-side and client-side technologies ensures a seamless and responsive user experience, meeting the project objectives and empowering users to optimize their daily schedules.

User Registration and Authentication: Method: Utilize PHP for user registration and login functionalities. Implementation: Create PHP scripts to handle user registration, securely store user data in a MySQL database, and implement a login system with password encryption. User Interface: Develop HTML forms for user registration and login.

Task Management: Method: Implement PHP scripts to handle task creation, modification, and deletion. Implementation: Design a database schema to store task details, connect PHP scripts to the database for CRUD operations, and ensure secure data handling. User Interface: Develop HTML forms for task creation, editing, and deletion.

Task Listing and Sorting: Use PHP and JavaScript to display tasks and allow users to sort them based on priority or due date.

Implementation: Fetch task data from the database using PHP, create dynamic HTML elements using JavaScript for task listing and implement sorting functionalities. User Interface: Develop a visually appealing and user-friendly task listing interface.

User Dashboard: Develop a user dashboard for quick access to tasks and relevant information. Utilize PHP to gather user-specific data from the database and present it in a consolidated dashboard. Use JavaScript for dynamic updates. Design an intuitive dashboard layout for a seamless user experience.

V. Conclusion

In conclusion, web-based time and productivity analysis tools have become invaluable assets in today's dynamic work environments. These tools offer a range of features and functionalities designed to empower individuals and teams to better understand, manage, and optimize their use of time. The ability to monitor digital activities, track tasks, and analyze productivity trends provides a wealth of insights that contribute to enhanced efficiency and effectiveness.

Web-based time and productivity analysis tools not only assist in identifying time sinks and bottlenecks but also foster a culture of accountability and continuous improvement. The real-time data and visualizations offered by these tools enable informed decision-making, allowing individuals and organizations to adapt swiftly to changing priorities and demands.

By cultivating a harmonious relationship with time through these tools, users can transform the abstract concept of time into a tangible and strategic resource. Whether through the use of sophisticated analytics or intuitive interfaces, these tools aid in the cultivation of intentional choices, purposeful work, and meaningful achievements. They act as digital companions on the journey of productivity, offering actionable insights that propel individuals toward a future defined by their deliberate decisions and accomplishments.

As the workplace continues to evolve, the importance of web-based time and productivity analysis tools is likely to grow, providing individuals and teams with the means to navigate the complexities of modern work life while fostering a proactive and empowered approach to time management.

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