Implementation of Project Management System Based on Project Management

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ABSTRACT

With the rapid development of information technology and the gradual expansion of education, the construction of campus information is accelerating. The use of information technology to promote teaching reform is an important idea for the current school education reform, it is to improve the quality of teaching specific measures, especially new requirements is needed for colleges and universities as they continue to expand enrollment and teaching resources. Way to make full use of limited resources, use more scientific management methods and teaching methods, improve work efficiency, ensure the quality of teaching, improve the effectiveness of running a school, has become an important subject of university research. The application of computer in teaching management is the key to realize the scientific and modern teaching management. To improve the quality of teaching, we must grasp the various teaching links. The examination is an important part for the students to test the effect of learning. Objective evaluation of the students as a means of curriculum construction is also an important part. In the school teaching work, the traditional test questions management is usually in the form of questions or test paper set, and design manually by teachers, which is large, and complex. The automatically generation system for test paper integrated the traditional manual volume, which solves a lot of problems, such as avoid unnecessary duplication of effort, saving the human resources and time; the use of scientific measures to evaluate and evaluate the difficulty of harmonizing papers, the effective quality of test papers; and a significant reduction in the probability of missing errors in the test paper, reduce unnecessary trouble.

KEYWORDS: automatic test paper, manual volume, teaching management scientific.

1. Introduction

In the implementation of the project, it is essential to ensure that the project can be completed according to the intended target. Every project has planned start time and end time, tasks and the specific composition of the project. In order to ensure the timely completion of the project, projects and tasks need proper monitoring and control. The current progress of the project is usually achieved through the 'milestone mission' approach in the key path of the project plan. The implementation of the project tasks is only clear and visible at the milestone task. In the case of rigorous, high-quality aircraft maintenance projects that only monitor the use of milestones, problems can only be found at milestone missions and cannot be found in real-time during project execution, and there is a lack of visibility into the project's operational process. There is a certain lag in active control. In this paper, the combination of process monitoring method and overall monitoring method has the following advantages: achieve the task level monitoring in the implementation of the project; real-time monitoring of project progress; improve efficiency; ensure the completion of the project on time; optimize the project schedule and cost planning; to achieve a reasonable allocation of resources and cost control; improve the quality of service to a large extent, problem handling speed and customer satisfaction.
2. Project Management

2.1. Project

United States project management organization PMI (Project Management Institute) defined project as 'a special task to be completed, which designed to meet a specific set of goals within a certain period of time' in PMBOK (Project Management Body of Knowledge). The Project Management Knowledge System (CPMBOK) proposed by the China Project Management Research Council defines the project as 'a special limited task to be completed, which is a number of related tasks that meet a specific set of goals within a certain period of time'. The project has the following characteristics:

(1) Target clarity: Each project has a clear goal, the project objectives are usually based on its scope of work, schedule and quality performance requirements.

(2) Timeliness: the project often has a clear start date and end date, endless work or repetitive work is not called as 'project'.

(3) One-time: the project is a one-time task. Disposable is the basic feature of project distinction and other tasks (operations). This means that each project has its particularity. There are no two identical projects that have not happened before, and will not happen in the same condition in the future. When the project's goal has been achieved, or project goal cannot be achieved for some reason and forced to terminate, it means that the project has ended.

(4) Unique: the uniqueness of the project is reflected in difference aspect such as objectives, resource needs, customers, project leaders. This difference is random, so it has a unique nature.

2.2. Project Management

Project management is a management approach that accompanies the need to build and manage large projects. Its research object is in the premise of a certain amount of funds, through scientific management and management, to achieve the established project objectives. Project management technology in scientific research and production practice has increasingly shown great advantages, so in the world, it has been widely promoted and applied, especially in the important, complex, time constraints, limited resources, one-time task, and this means project management has a unique advantage. The basic meaning of project management has a variety of descriptions, United States Project Management Institute 'Project Management Knowledge Guide PMBOK' made a summary with more authoritative: 'Project management refers to the various systems, methods and personnel come together and complete task with limit budget and quality objectives in the specified time. Effective project management refers to the planning, guidance and control of the organization's resources within the time required to achieve the specific objectives and targets. Project management is the study of the time and money under certain conditions, way to plan scientifically, control and organize to achieve the goal of science.' Project management originated in the United States, the ideological system formed in the 20th century, 50 years, is usually considered the product of the Second World War. At that time, project management was mainly used in manufacturing, emphasizing the ability to predict and repeat activities, the focus of management in the manufacturing process of rationality and standardization. After the 1990s, with the advent of the information age and the rapid development of high-tech industries, the uniqueness of affairs replaced the repetitive process, the information itself is dynamic, changing, flexibility has become the core of the new order, it has been found that project management is a key means of achieving flexibility. Project management in the mode of operation can maximize the use of internal and external resources, improve management efficiency fundamentally. After a long exploration, development of project management theory and technology continue progress, and gradually developed into an independent discipline system and industry.

2.3. Project management process

Project management process refers to the organization, arrangement and optimization of the project. The project management process includes problem definition, project definition, project planning, project organization, resource allocation, project scheduling, project tracking and reporting, project control, and project end. The following figure is the step of project management.

The project management process does not exactly match the cycle of the software, and some project management activities exist at a certain stage (or a specific stage) of the project, such as a clear project background in project planning, defining project objectives, and so on. And some project management activities are consistent throughout the project, such as software configuration and quality management.

2
3. Monitoring System Project

3.1. Project research background

The requirements of the monitoring system are derived from a government department. The main functions of the monitoring system are to monitor the real-time video images from the front-end stations by monitoring the hardware and software (such as network video servers, cameras, alarm points, etc.) of the monitoring system software. We have to submit within the specified time to complete the development of monitoring software, and to ensure the quality of the software. We talk about software project management, the scope, progress, quality, risk and other aspects of the implementation of standardized management which applied to our project. This paper discusses the application of project management knowledge in general software projects and summarizes some valuable project management risks. This provides a useful example and summary for the future of software project implementation.

3.2. Project objectives

The project will be completed in accordance with the requirements of six months, the first project to be completed within the construction period.

Relying on the green network, to establish a unified video compression format, unified control mode, unified transmission and browsing of the general video surveillance management platform to achieve the purpose of monitor the unified management of audio information in one monitoring area; at the same time to achieve long-range video surveillance image flexibility call, browse, to achieve a variety of control operations, and to achieve the image recording and playback and other functions.

3.3. Feasibility analysis

We study the feasibility of the project from a number of technology aspects, such as economics, management, and organize the conclusions of the feasibility analysis into a 'feasibility analysis report' to show all possible outcomes of the project.

3.4. Technical Feasibility

From the technical point of view, our team has the human resources with such technical ability, and can train the technical staff in the development team through training, etc., the technical feasibility of the analysis should take demand into account, to achieve technology aspects of the impact.

3.5. Management Feasibility

In the participation of personnel management and organization of the project, due to the progress of the project requirements are more intense, there should be has training and incentive mechanism. The management feasibility of the analysis needs to take personnel organization into account.

3.6. Economic viability

The project is the first project to cooperate with the company, the economic and impact benefits of the project are what we need. While estimating costs (including start-up costs and operating costs), tangible and intangible benefits are included in the analysis of economic viability. Economic feasibility analysis should take demand, business, cost, capital and other aspects into account.

4. Design and Implementation of Monitoring System

The monitoring system uses B / S structure, the data in system, functions and behavior is separated. The front is the demographic, responsible for logical expression. The middle is the application layer, allowing users to share and control business logic; Back-end is the service layer, the background data service allow the data flow between the client and the database. System developed by B / S architecture is user-friendly, easy to operate, easy maintenance upgrades, and with good openness. The system focuses on the visualization of the monitoring. For the overall progress of the project, the project task execution process monitoring and the project cost monitoring are respectively used in the Gantt chart, the Pioneer line graph which based on the two-way network graph, and the Earned value chart that reflect the two factors (progress, cost) are in the process of project implementation and provide strong support for planning renewal decisions.

The system consists of the following functional modules:
(1) Project definition and maintenance module: The module includes two views, which are 'new project' and 'project list of items'.

1. New project: create a new project, that is, the general definition of the project view. It is mainly used to describe the project name, project code, project duration, project description and notes and other basic information, as well as the sub-projects and tasks related information.

2. Project list of items: Show all items of the system. View information: Click the 'Project Name' in the first column of the project list, this will display the details of the project and subordinate sub-project and task information; Modify information: modify the project, sub-project and task information; Delete items: must be careful when delete the project time, delete only when the project is useless. Otherwise, this will cause the project data lost.

(2) Project decomposition module: the entire project process into a number of interrelated independent tasks to perform.

(3) Project flow chart drawing module: the task planning duration, task planning costs, pre-task, task organization and other basic information input operation; clear the logical relationship between tasks, draw the project flow chart.

(4) Project monitoring module: the progress of the project and the cost of real-time tracking, in the form of graphical display tracking results.

(5) Project planning adjustment module: qualitative analysis and quantitative analysis of the tracking results, whether the progress is lagging behind, whether the cost is over budget and other conclusions, as well as the follow-up tasks and the impact of the project. This can help in adjustment making for specific tasks or the entire project plan.

4.1. Project Management Element Monitoring Content

Progress monitoring: Progress monitoring and tracking of the project and its tasks, comparing the actual progress of the project with the planned progress, reallocating resources or modifying the project plan if the actual progress is ahead or lagging behind the planned progress. Progress monitoring also monitors the operational status of projects, tasks, and workflows because complex product development project management requires the integration of the environment, and can be effectively integrated with other data and needs to be integrated with workflow automation technology.

B. Resource monitoring: resource monitoring is mainly for the project's resource allocation, resource load, and etc. Actions like add, delete or re-allocation of resources is needed if abnormal phenomena occurred.

C. Quality control: quality control, including the design results and project management quality tracking and comparison, from the quality requirements to develop change plans, and strive to qualified design results for each step.

D. Cost monitoring: cost monitoring regularly collects the actual cost data of the project, carries out the actual comparison of the actual value of the cost and the planned value so as to take corrective measures in time before the cost is out of control.

E. Risk monitoring: risk monitoring mainly tracking risks, identified risks and providing risk information for the project. The relevant personnel can take contingency plans or application plan changes according to the risk situation.

4.2. Realization of visual monitoring mechanism

The project plan completes the project scope plan and definition, the project task definition, the duration estimation and the ranking, forms the project time network plan, completes the project resource plan, the cost budget and so on. Some members of the project team complete the project tasks through a corresponding tool in a certain process. The project management in this paper access to the progress, cost, quality, risk and resources and other aspects of information on the basis of project planning and present to relevant personnel in a certain form to achieve project monitoring and Visualization function.

There are four main steps in visualization monitoring mechanism to achieve:

(1) Decompose project WBS and establish decomposition structure of the project in order to determine the monitoring of particle size. Project decomposition structure is based on the needs of the project and the specific circumstances, the project will be broken down into a series of work unit or task that easy to manage. There are no rules for the division of the project structure. The key principle is the practical needed.

(2) Based on the workflow model of the corresponding workflow system, the project flow chart (similar to the project network map) is drawn, so that the project process is displayed in a graphical form to the monitor, and the whole process of project operation can be monitored in real time. This can also determine the key path of the project, the logical relationship between the various tasks, and as well as the free time difference and the total time difference.
(3) To develop the system and workflow system interface to achieve real-time data collection, as well as the structure of the project structure of the bottom of the work package to read the state.

(4) Analyze the data against the two monitoring elements- schedule and cost, which monitor the overall progress of the project (expressed as a progress percentage of the project); compare the actual progress with the planned progress based on the forward line method Progress Monitoring; based on the Earned Value method to compare the actual cost and planned cost, cost monitoring; the overall progress of the project show in the form of Gantt Chart; the progress of the project forward line, the project cost of the S curve shows real-time update of the three graphics above.

4.3. Monitoring and tracking in the monitoring system project

The key factor in the success of a software project is project management, and the key to the effective management of the project is the visibility of the project process. Since the software project process is a combination of logical activity processes, it does not have the visibility of a physical process. The purpose of software project tracking and monitoring is to provide sufficient visibility into the actual process of the project to ensure that an effective solution can be taken when the project is deviated from the project plan.

To track the size of the software work product (or the size of the software engineering product changes), take corrective action if necessary: Track the software workload and cost of the project, track the key computer resources of the project, track the software progress of the project, track the software engineering technical activities to track software risks associated with project costs, resources, schedules, and technical aspects.

Project control includes schedule control, cost control, quality control, etc. Specific control measures include: week, weekly, milestone report, submissions audit, process audit, configuration audit, risk tracking, and even some technical relevance activities, such as testing and the same review can also be included in the control range.

5. Cost Management in Monitoring System Projects

The main control elements of project management are quality, schedule and cost. The goal of project management is to find the optimal solution for progress and cost under the premise of ensuring quality, and to ensure effective control of costs and progress.

5.1. Cost management process

Project cost management consists of four processes.

(1) Resource planning process: Decide what resources (people, equipment and materials) and the requirements for each resource are required to complete the project's activities.

(2) Cost estimation process: This process estimates the approximate cost of each resource required for each activity of the project.

(3) Cost budget process: This process assigns the estimated total cost to a specific job.

(4) Cost control process: This process controls the project budget changes.

5.2. Resource Planning For the Project

Determining the project's resource plan is to determine the project's resource requirements. Before the project starts or when the project starts, there is a clear understanding of the resources required for the project.

Resource planning is generally concerned with the allocation of resource content and resources in time, so resource planning is a series of resources and time.

In the software project, human resources are the most important and the most complex resources. The following table is the project stage of the human resources needs.

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Human Resource</th>
<th>Task Days</th>
<th>Resource Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Management</td>
<td>Project Manager</td>
<td>114</td>
<td>1</td>
</tr>
<tr>
<td>User Requirements Research</td>
<td>Design Engineer</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>User Requirements Analysis</td>
<td>Design Engineer</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Confirmed User Requirements</td>
<td>Design Engineer</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Modify specification brochure</td>
<td>Design Engineer</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
5.3. Project Cost Estimate

1. Get the cost unit price

The unit price of the resource is calibrated: for this project, the direct cost consists of two parts, which are the cost of labor and the cost of the project.

Through the relevant departments of the company to provide the cost of unit price, we can get the cost of the unit price of each unit below.

(1) Human resources costs: human resources costs by the month, the human weeks, and the project in the human resources are divided into four categories: design engineers, development engineers, test engineers and project management staff.

(2) Traffic costs in the city: As the destination of the project is in the city, transportation fee is excluded and we take the company’s maximum standard as unit price.

(3) Communication costs: the company has monthly communication costs standards.

(4) Other costs: Any temporary, sudden, and small fees.

The unit price of each item of the project is listed as follows:

<table>
<thead>
<tr>
<th>Personnel Type</th>
<th>Salary</th>
<th>Transportation Fee</th>
<th>Communication Cost</th>
<th>Other Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Engineer</td>
<td>220</td>
<td>20</td>
<td>10</td>
<td>10000</td>
</tr>
<tr>
<td>Development Engineer</td>
<td>200</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Test Engineer</td>
<td>180</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Project Management Staff</td>
<td>220</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

2. Get the workplace and duration from the schedule

Work Breakdown Structure (WBS) gives the duration of each task and the place of work, which is the main basis for cost estimation. Direct costs during the project are as follows:

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Human Resource Name</th>
<th>Number</th>
<th>Time / Day</th>
<th>Salary</th>
<th>City Transportation Fee</th>
<th>Communication Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Management</td>
<td>Project Manager</td>
<td>1</td>
<td>114</td>
<td>25080</td>
<td>2280</td>
<td>1140</td>
<td>28500</td>
</tr>
<tr>
<td>User Requirements Research</td>
<td>Design Engineer</td>
<td>1</td>
<td>4</td>
<td>880</td>
<td>80</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>User Requirements Analysis</td>
<td>Design Engineer</td>
<td>1</td>
<td>5</td>
<td>1100</td>
<td>100</td>
<td>50</td>
<td>1250</td>
</tr>
<tr>
<td>Confirmed User Requirements</td>
<td>Design Engineer</td>
<td>1</td>
<td>2</td>
<td>440</td>
<td>40</td>
<td>20</td>
<td>500</td>
</tr>
</tbody>
</table>
### Modification Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Design Engineer</th>
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<th>2</th>
<th>440</th>
<th>40</th>
<th>20</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary Design</td>
<td>Design Engineer</td>
<td>1</td>
<td>8</td>
<td>1760</td>
<td>160</td>
<td>80</td>
<td>2000</td>
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<tr>
<td>Detailed design</td>
<td>Design Engineer</td>
<td>1</td>
<td>12</td>
<td>2640</td>
<td>120</td>
<td>60</td>
<td>2820</td>
</tr>
<tr>
<td>Network Interface Module Development</td>
<td>Development Engineer</td>
<td>1</td>
<td>10</td>
<td>2000</td>
<td>200</td>
<td>100</td>
<td>2300</td>
</tr>
<tr>
<td>Audio and Video Decoding Module Development</td>
<td>Development Engineer</td>
<td>1</td>
<td>25</td>
<td>5000</td>
<td>500</td>
<td>250</td>
<td>5750</td>
</tr>
<tr>
<td>Audio and video playback module development</td>
<td>Development Engineer</td>
<td>1</td>
<td>20</td>
<td>4000</td>
<td>400</td>
<td>200</td>
<td>4600</td>
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<tr>
<td>Motion Detection Alarm Module Development</td>
<td>Development Engineer</td>
<td>1</td>
<td>20</td>
<td>4000</td>
<td>400</td>
<td>200</td>
<td>4600</td>
</tr>
<tr>
<td>Video module development</td>
<td>Development Engineer</td>
<td>1</td>
<td>10</td>
<td>2000</td>
<td>200</td>
<td>100</td>
<td>2300</td>
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<tr>
<td>System Test</td>
<td>Test Engineer</td>
<td>1</td>
<td>7</td>
<td>1260</td>
<td>140</td>
<td>70</td>
<td>1470</td>
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<tr>
<td>User Test</td>
<td>Test Engineer</td>
<td>1</td>
<td>5</td>
<td>900</td>
<td>100</td>
<td>50</td>
<td>1050</td>
</tr>
<tr>
<td>System commissioning test</td>
<td>Test Engineer</td>
<td>1</td>
<td>10</td>
<td>1800</td>
<td>200</td>
<td>100</td>
<td>2100</td>
</tr>
<tr>
<td>User Training</td>
<td>Test Engineer</td>
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<td>3</td>
<td>540</td>
<td>60</td>
<td>30</td>
<td>630</td>
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<tr>
<td>Test run maintenance</td>
<td>Test Engineer</td>
<td>1</td>
<td>5</td>
<td>900</td>
<td>100</td>
<td>50</td>
<td>1050</td>
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<tr>
<td>Acceptance Report</td>
<td>Test Engineer</td>
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<td>4</td>
<td>720</td>
<td>80</td>
<td>40</td>
<td>840</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>18</td>
<td>266</td>
<td>55460</td>
<td>5320</td>
<td>2660</td>
<td>73440</td>
</tr>
</tbody>
</table>

### 6. Conclusion

Based on the project management mode, the visual monitoring mechanism and the visual monitoring system with B / S structure, the progress and cost of the project at different levels can be tracked. Monitor the project through the computer network to provide the digital project monitoring environment. Using SQLServer2000 database as a background support, the design and development of a visual project monitoring system play an important role in the modernization of management.

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