



## Developing of Scheduling and Tracking Project Lifecycle Software

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### Abstract

This research aims at developing a software mechanism for scheduling and tracking the status of pre-planned tasks using an open source to achieve projects in government institutions based on project management theory. This mechanism will facilitate the system process via planning, managing, and evaluating the project team activities to ensure that the project is running according to the time and financial plans. The system will also enable the work team to share tasks information and follow their status during the lifecycle of these tasks. The system will also allow the project management to benefit from these reports to continuously assess individuals, tasks, and refine management decisions for present and future projects. The study is also relied on an open source project management software (ODOO) in planning, implementation, and the following up of an academic quality accreditation project of the department of (MIS) in the College of Business (King Khalid University, KSA, 2018-2020). The open source management software has been adopted throughout the development as benchmarking tool. The application of such software will allow improvement, and control participants performance and achievement of the tasks entrusted to them. Such as faculty task scheduling and coordination on tasks. Also, some software components will be added and reused.

**Keywords:** open source software, project management, tasks, activity, project

### 1. INTRODUCTION

Managing a project assumes an accurate follow-up and control of all the activities related to project till its full accomplishment. This following-up reflects a strategic vision and a long-term orientation that insures a successful completion of the project. Project management is one of the key tools used to achieve a strategic plan by ensuring that a project is completed and delivered in due time, and with respect to quality and cost requirements [1]. Many aspects define a project management: activities, time, cost, quality, human resources, communication, risk,



and procurement [2]. A project is by its nature temporary and oriented to produce totally new products or services. The emergence of new objectives during the project implementation is not an exception. Statistics of many countries the statistics conducted by many countries indicate that most projects failed to achieve their objectives in terms of duration, and cost, which requires a scientific project study and a continuous following-up carried out by the staff responsible [3].

The problem of the study is related to the lack of a mechanism that helps to follow up, and achieve the tasks of a project, and the absence of a system that provides immediate reports on completed, or ongoing tasks. It is also difficult for beneficiaries and managers having decision-making authority to have access to report on tasks. They will lead to a difficulty in the evaluation of the individual's performance. It will also result in a randomness of the organization of the work for the project owners. Also, a serious problem that appears in the current mechanism is the use of paper documents in the follow up and management of the project tasks. This problem has three aspects: cost, time, and cooperation.

As for the cost, it is high under the current mechanism, due to the need of the attendance of the team members in the workplace, and the submission of written reports. Thus, written each member must have an office, and must be provided a place to save project documents. From the time point of view, team members need a long time to report on the status of their tasks, as well as to track the tasks. Therefore, members must meet periodically to study the status of the mission.

For cooperation, in the current situation cooperation among members or teams in the project is very weak, for cooperation is through face-to-face confrontation.

The proposed mechanism offers an electronic system as a software application that can be used by various government institutions, as well as ordinary users at all levels where solutions are suggested to the above-mentioned difficulties, and the factors that limit the possibility of improving the process of projects management. The mechanism is supposed to provide everyone's needs of services, which is an essential factor in project life cycle.

The proposed software application uses multiple techniques like email to notify member about his tasks. It also provides a central way to store the users' and institutions' information in a single database. It allows connect between the proposed software application and google drive to store the accreditation files.

There are several studies related to Developing of Scheduling and Tracking Project Lifecycle Software, namely Analysis and Design of a Project Management Information System: (Practical Case in a Consulting Company) [4]. This study presents the design process of an Information Systems for Project Management; its main purpose is to manage investment projects throughout their life cycle [4]. Project management information systems: An empirical study of their impact on project managers and project success [5]. The purpose of this study is to empirically assess the quality of the PMIS presently used in organizations and to examine their impact on project managers and project performance, based on a PMIS success model [5]. Rethinking the Project Management Process by Using

Unified Modeling Language [6] This article recommends transformation rules from project items into objects and project charts into UML diagrams, to model all project items and processes by using UML [6].

**Table 1.** Comparison between Existing and Proposed Systems

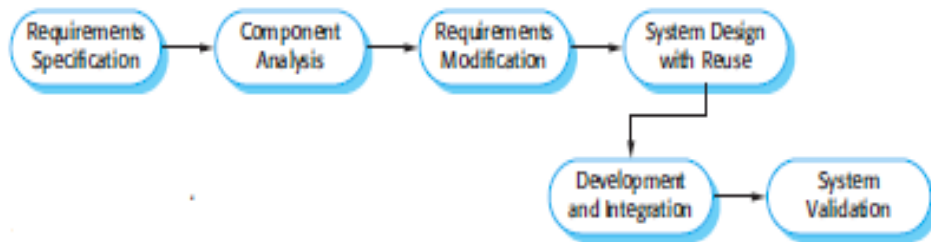
Compared Aspects	Existing System	Proposed System
Cost	Maximum	Minimum
Time to prepare report	Can be long periods	Minimum
Time to meet members	Can be long periods	Minimum
Storing documents	In place	Online place.
cooperation	Via meeting	Via software, and e-mail

This study aims to Provision of detailed information projects, and tasks to the members and managers, and developing a mechanism that includes everything related to the management and follow-up of projects when implementing the plans of governmental administrative units, Provision of immediate reports on project tasks separately, or combined with other tasks. Provision of an access to the mechanism form the Web, and from any place to follow-up, and achieve tasks, to connect team member with each other via software application.

## 2. Research Methods

### 2.1 Methodologies

The reuse of an oriented model is one of the most widely applied methodologies recently, because of the large base of reusable software components and the integrated framework for the composition of these components (Figure1).



**Figure. 1** Methodology of Reusable Software Components

The research is also based on the project management methodology combined with an open source software to develop a mechanism that improves a project management [7].

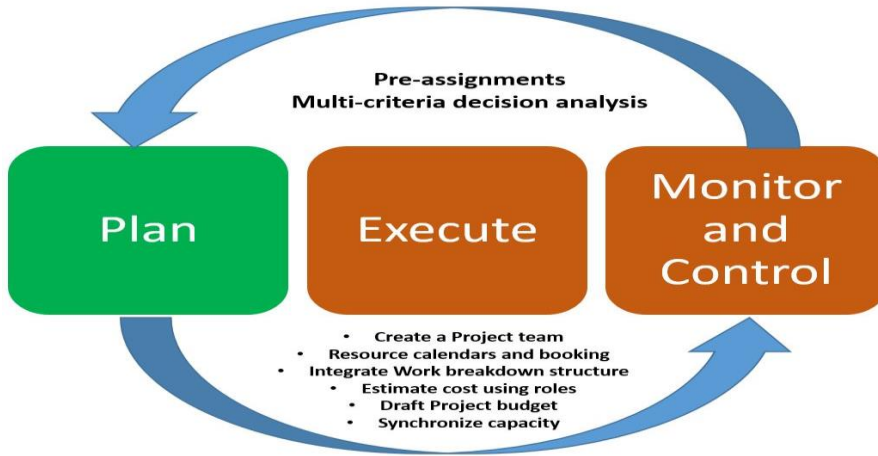


Figure. 2 Project Management Methodology

## 2.2 Methodology approach

This research begins with the study of literature review. Search related quality journals. The references have cited in the text and listed in the reference section. The next phase is data collection that is directly collected from the department quality unit. The collected data and documents have used as protocol model for the project. Importantly, the data set is used for validation using ODOO software. Based on the processed results, the result has derived and compare with the desired result.

## 2.3 Project Management Software Tools

### 2.3.1. ODOO

ODOO is an integrated ERP software system available free of charge. It is a ready-to-use program with a source code that might be modified according to the AGPL license. The system consists of a basic platform and a set of software modules that provide user with the functions of the program, such as accounting, sales, procurement, warehousing, manufacturing, customer relations, human resources, points of sale and others [8]. This system offers several advantages as follows:

- 1) The user can activate the software modules that provide the functions he only needs, which makes the system easier and less crowded.
- 2) The possibility to add new or modified available functions easily by activating additional software modules or creating new software modules.

- 3) The possibility of deploying and exchanging additional software modules among system users, which provides additional functionality not available in the platform [9].

### **2.3.2. MS PROJECT**

MS PROJECT is a software program that provides project planning by scheduling tasks and budgeting. It can analyze, and issue reports. Communications is also possible. It enables planning of several projects simultaneously, whereby resources can be shared between different projects. Reports could be created to analyze the status of the project and to inform the beneficiaries about the progress status. Project reports can be reviewed, staff performance follow up is possible, and project resources can be planned [10].

### **2.3.3. PRIMAVERA**

PRIMAVERA is a program used to plan projects. This program is used to prepare project schedules, calculate cost, and to control a project achievement. It provides the possibility to calculate the duration of the project, the resources to be used, and to determine the optimal use of these resources. In addition, previous projects could be reviewed and compared to the current situation, and to find out the delay in the time, or budget deficit [11].

### **2.3.4. ASSMBLA**

It is an open-source, and collaborative project management tool that is used for commercial purposes. It allows companies to hire its PM applications online, and then to lessen their software development expenses [12].

## **3. A COMPARISON OF PROJECT MANAGEMENT SOFTWARE TOOLS (PMST)**

The authors determine 14 criteria to evaluate and compare the software quoted above. These criteria are as following [13]:

- 1) Task Scheduling: Task scheduling is the activity that define the start and finish times for each activity. The result of task scheduling is a feasible project schedule.
- 2) Resource Management: With this feature, project managers allocate the proper resources to activities and tasks for the purpose of meeting the project requirements.

- 3) Collaboration: The collaboration awareness is important for managing inter-team development activities. These activities often lead to shared artifacts that require careful handling.
- 4) Time Tracking: Time tracking enables recording, analyzing, estimating, and reporting the time spent on project activities. With the help of time, tracking employers' timesheets and expenses is managed.
- 5) Estimation: The activity estimates project effort, cost and schedule. Project managers can generate, manage and validate estimates of project effort.
- 6) Risk Assessment: A successful risk analysis reduces long-term expenses and prevents project failures. The risk assessment enables the project manager to recognize and schedule risk countermeasures during the project execution.
- 7) Change Management: It is the controlling of project plans, resources, products, and cost of project development process. By change management, the effects of changes on requirements and above issues can be easily observed and managed.
- 8) Project Analysis/Reporting: It is an analysis of product, process, person or organization related to a project development effectiveness by Gantt, PERT, CERT or other custom formats.
- 9) Document Management: It enables managers or necessary project members to customize, share, distribute, recover, authenticate, secure and also manage versions of the documents.
- 10) Communication Tools: They are used for informing stakeholders and project members about the status of the project and published documents. Communication tools may use e-mail notifications and other means as well.
- 11) Access Control: It control access to the resources of the software tool to authorized users and restrict it to unauthorized one.
- 12) Quality Management: This function is about managing all activities, tasks and documents that are related to ensuring a certain level of quality for policy description, planning, assurance, control, and improvement.
- 13) Web Based: Some tools are accessible via a network such as the Internet or a LAN.
- 14) License: An open-source license is a type of license for computer software and other products that allows the source code, blueprint or design to be used, modified and/or shared under defined terms and conditions [14].

**Table 2.** Comparison between project management software's

Comparison Criteria	PMST	MS Project	PRIMAVERA	ASSMBLA	ODOO
Task Scheduling		✓	✓	✓	✓
Resource Management		✓	✓	✓	N.E.

Collaboration	✓	✓	✓	✓
Time Tracking	N.E.	N.E.	N.E.	✓
Estimation	N.E.	N.E.	N.E.	✓
Risk Assessment	N.E.	✓	N.E.	✓
Change Management	N.E.	N.E.	N.E.	✓
Project Analysis/Reporting	✓	✓	N.E.	✓
Document Management	✓	✓	N.E.	✓
Communication Tools	N.E.	N.E.	N.E.	✓
Access Control	☒	☒	N.E.	✓
Quality Management	☒	N.E.	N.E.	✓
License	L	L	O.S	O.S
Web Based	☒	☒	✓	✓

O.S: Open Source L: Licensed N.E.: Need Further Experimentation

#### 4. Implementation of the Mechanism (ODOO):

To implement projects through the ODOO software, the owner of the project must have an account on the software through e-mail, as well as the establishment of the tasks of the project, and then share and assign the tasks of the project with the members of the various teams to implement them. These tasks must be followed up in terms of achievement. Reports must be prepared on what has been accomplished, not completed, and ongoing [15]. Through the following interfaces, project management, implementation, and follow-up using the software ODOO open source [16].

##### 4.1. The Basic ODOO Interface

The interface above allows users to choose the modules provided by ODOO to work on. The modules must be chosen depending on the nature of the project to work in an integrated form with others to achieve the project: employees, calendar, and discussions. Also, through this interface new events in the project can be seen. Account information (owner, and members) can be controlled.

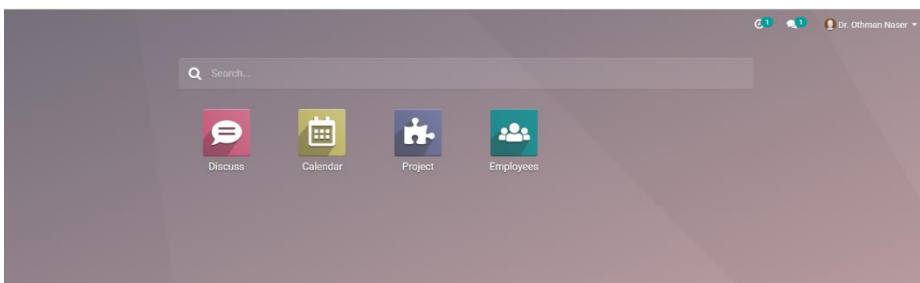


Figure. 3 The Basic ODOO Interface

## 4.2. Main Tasks Within the Project

Through this interface the user can view the main tasks within the project. In addition, a series of important details about these tasks are shown including: the person in charge of the task, whether the mission is marked by a golden star. Also appears the top of the page information about task classification (finished, in progress, or new) with an indicator showing each task status.

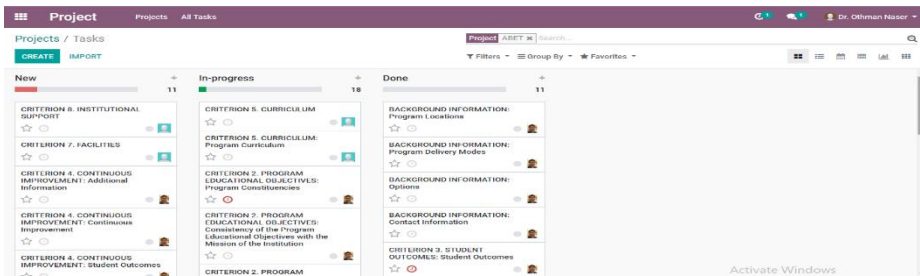


Figure. 4 Main Tasks Within the Project

## 4.3. Tasks details

Through this interface, ODOO allows controlling the sub-tasks of the main task within the project via creating sub-tasks or viewing sub-tasks under the main task (as a subproject), as well as modifying the main task or sub-tasks. The interface enables task sharing with other members of the team responsible for executing the task, which, in turn, helps achieving cooperation between the team members, and following up the task and tasks of the subsidiary. Also, the main task and the followed sub-tasks could be archived through the interface in full details the task, as well as creating, or deleting a copy of the task.

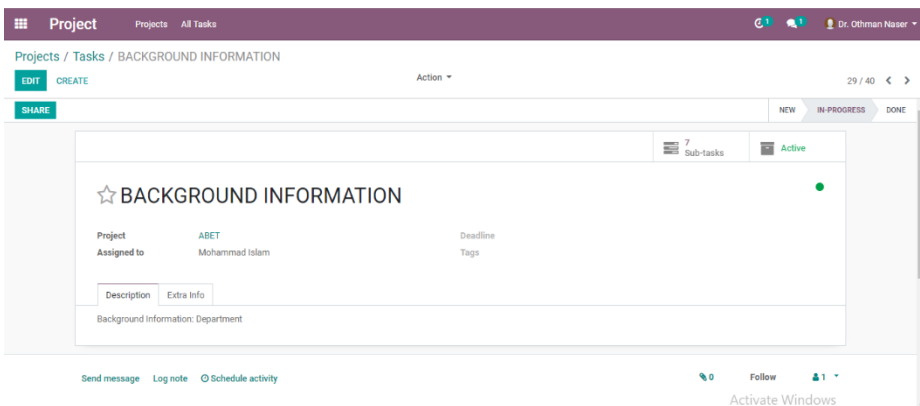


Figure. 5 Tasks details



#### 4.4. Tasks Report According to Responsible Person:

Through this interface, tasks can be viewed according to the person asked to perform. The interface shows the tasks achieved (green), as well as tasks that are delayed (listed according to the delay time (from yellow to red)).

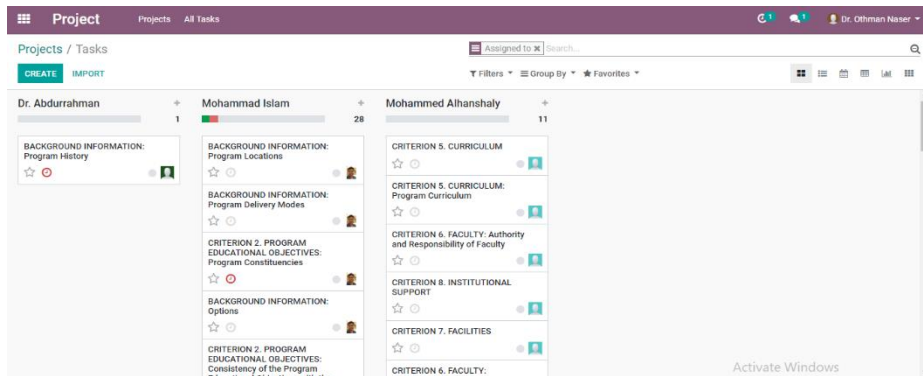


Figure. 5 Tasks Report According to Responsible Person

#### 4.5. Tabular Interface Showing Projects Tasks

Through this interface, the tasks can be displayed in a tabular format that shows three main elements of the task details: the project to which the task belongs, the person in charge, and the status of the task (finished, in progress, or new).

Title	Project	Assigned to	Stage
CRITERION 5. CURRICULUM	ABET	Mohammed Alhanshaly	In-progress
BACKGROUND INFORMATION: Program Locations	ABET	Mohammad islam	Done
CRITERION 5. CURRICULUM: Program Curriculum	ABET	Mohammed Alhanshaly	In-progress
BACKGROUND INFORMATION: Program Delivery Modes	ABET	Mohammad islam	Done
CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES: Program Constituencies	ABET	Mohammad islam	In-progress
BACKGROUND INFORMATION: Options	ABET	Mohammad islam	Done
CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES: Consistency of the Program Educational Objectives with the Mission of the Institution	ABET	Mohammad islam	In-progress
BACKGROUND INFORMATION: Contact Information	ABET	Mohammad islam	Done

Figure. 6 Tabular Interface Showing Projects Tasks

### 5. RESULTS

The current study and feedback is aimed to improve the completion of the business electronically, through the open source systems that support the business activity and the procedures carried out, and that is through:

- 1) Integrating Modules in the open-source software (ODOO) and working on them, in order to work in an integrated manner.
- 2) Easily check team's planning and reschedule to keep within deadlines.
- 3) Keep track of deadlines and progress of projects with a clear overview.
- 4) Keep a good overview of workload, and of the status of individual tasks.
- 5) Relying on an open source software, especially in small businesses with limited capital as a start.
- 6) Developing training programs for the use of the open-source software (ODOO) or other open source software according to the system proposed to implement in order to accomplish the work of the institution.
- 7) Providing the necessary requirements to implement open-source software (ODOO), especially since the majority of open-source software are found to be internet-based which implies that the internet service is available at higher speeds, and that there are devices serving the work on open systems.
- 8) Business reengineering for compatibility and integrity with open-source software in terms of implementation of procedures on the system, and the nature of work.
- 9) Enabling developers to work in the open systems environment in order to make improvements covered in open systems, and to benefit from them in accomplishing the work.
- 10) Enhancing member's communication and cooperation.

## 6. CONCLUSIONS

This study successfully addressed a real time problem in the department. It helps in managing many projects simultaneously without much bothering about the maintenance cost. It does not burden additional cost to the department. This study result shows that open-source software such as ODOO is possible solution to adopt for organizational requirements. Here, the selection of project is genuinely based on the nature of requirements of an organization. This project has been implementing to manage the department activities and more specifically for accreditations purpose. This also helps in preparing the ABET accreditation requirements effectively. Presently we apply this for the departmental needs. For future direction, we will apply improved method for the college administration and then for the university administration requirements.

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