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The Use of PM Technology Tools for
Managing Digital Solutions Projects
by Larry D. Icard, PhD, Johan Botha
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The Use of Project Management Technology Tools for Managing Digital Solutions Projects: A case example [1, 2]

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Abstract

The use of project management software has increased in recent years. Working conditions have changed over the years due to multiple factors, such as team members working remotely because of the COVID-19 pandemic, supply chain disruptions, and, most importantly, the advancement of project management software. In South Africa, the frequency of load shedding (power outages) is placing additional constraints on using traditional methods and tools for managing projects. These trends have increased interest in supplementing and streamlining organisations' administrative capacity for planning, organising, managing, and tracking tasks with project management software. This paper discusses using project management software to develop and launch multiple information technology projects that support social and economic development and promotes better health for South Africans. This paper provides a synopsis of project management software's history, types, and critical features. A case example illustrates the use of a project management

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cloud-based program across all phases of project management. The discussion concludes with three significant factors to consider in using project management software.

Keywords: Project management, software, cloud-based, South Africa, Case example

Introduction

During the last 20 years, there has been a significant increase in the use of project management software. Project management software is used in a variety of industries, including construction, manufacturing, pharmaceuticals, human resources, computer and software development, telecommunications, and engineering services. These software management programs provide a set of tools for structuring and organising projects of any size so that teams are able to monitor and control project progress from start to finish. In recent years interest in using project management software has heightened as a result of team members working remotely because of COVID-19 restraints. Additionally, climate change (e.g.., droughts, floods, fires) and social unrest have contributed to rapid transformations in how business is conducted (Collyer et al., 2010). In South Africa, the frequency of load shedding (power outages) is placing additional constraints on traditional project management methods. These social, environmental and infrastructure factors, accompanied by rapid changes in digital devices and information technology, contribute to the increased use of project management software to overcome time, cost, and performance specifications constraints (Badiru, 1991).

This paper shares our experiences using project management software to develop and launch information technology. This paper provides a brief overview of project management software's history, types, and critical features. A case example illustrates using a cloud-based project management application for developing and launching information technology innovations to support social and economic development and better health for South Africans. The discussion highlights lessons learned using a cloud-based project management tool and offers suggestions for adopting and using project management software.

I. History

The history of project management software can be traced back to the history of the discipline of project management. One of the earliest tools for managing projects was developed by Henry Gantt, a mechanical engineer and management consultant known for his contributions to scientific management development and the creation of Gantt chart's in the early twentieth century. Today

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Gantt charts are considered an important management tool and are a critical function of modern project management software (Garel, 2013).

In 1957, Dupont Corporation developed the Critical Path Method (CPM) to identify tasks, estimate project duration and schedule flexibilities (Kelley Jr & Walker, 1959). During this period in CPM was created, the U.S. Navy Special Projects Office developed the Program Evaluation Review Technique (PERT), a statistical tool for analysing tasks by identifying processes and components, reducing the amount of time needed to complete a project (Ewart & Nanney, 1974). Building on PERT, the United States Department of Defense, NASA, and the industrial military complex created and mandated the Work Breakdown Structure (WBS) Approach for its projects. WBS is a hierarchical and incremental decomposition of a project into phases, deliverables, and work packages (Project Management Institute, 2021). In 1987, the Project Management Institute recognised the adoption of WBS by private enterprises and businesses, and today it remains a standard project management tool (Sanghera, 2019). Today there are many instruments available for project managers to utilize. A survey of 753 projects by Besner and Hobbs (2006) found that 72 project management tools were often used in projects with budgets of $1 million or more.

The growth of information technologies (IT) and information systems (IS) in the late twentieth century, coupled with the advent of personal computers and networking infrastructures, led to the ability to multitask and efficiently manage complex project schedules. These factors contributed to the development and use of project management software programs. Evidence shows that 80% of project management professionals use project management software for planning and control (Pellerin et al., 2013). Reports indicate that project management software makes a difference in teams' performance and show that 77% of high-performing teams studied use project management software (Kissflow, 2022; Patanakul et al., 2010; Pellerin et al., 2013).

II. Types

Project management software can be broadly classified into two groups. One group falls under the heading of low-end systems. Low-end systems are designed for personal computers and support limited features such as project scheduling and cost management. Another group falls under the category of high-end tools. High-end systems take advantage of the Internet and allow organisations to manage concurrent projects with high resource and equipment control and coordination in different locations.

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III. Key features

Most project management tools typically comprise specialized features to streamline the project management lifecycle. Project management software comprises four key features: project planning and scheduling, team collaboration, time tracking, and reporting. In addition to these critical features, the generation of project budgeting, quotes, and billing are standard in high-end programs. In the following case example, we highlight the key features of a cloud-based project management software tool used to develop and launch information technology innovations. The goal of using this program is to support social and economic development and promote better health for South Africans.

IV. Case Example: CCT ICT Solutions Development & Delivery

Background

The Centre for Community Technologies (CCT) at Nelson Mandela University in South Africa develops and launches various digital solutions to support social and economic development, and promote better health for South Africans. These solutions include the award-winning Ncediso App, an integrated mobile application to upskill community healthcare workers in areas with limited resources for healthcare; KaziHealth App, an employee wellness self-management tool; and a COVID-19 monitoring tool utilized by the South African government. These and other digital solutions developed by CCT support healthcare, digital social innovations and entrepreneurship, educational technology, and digital participation. At CCT, more than one project is in various stages of design and development at any given time and managing multiple projects can be challenging. Conflicting priorities, overlapping resources, and competing deadlines are among the many challenges CCTs face in managing several projects simultaneously.

Use of Project Management Software

The selection of the appropriate project management software is essential for a project's success. Points to consider in selecting a program include the size of the organisation, the complexity of the project, features and tools, ease of use, customizability, and pricing (Stan, 2022; TrustRadius, 2022). Our decision to select the software management program ClickUP was driven by price, ClickUp offers a free version with unlimited numbers of users, and ease of use. The free version features include communication and collaboration tools, task assignment and status, and alerts.

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The program allows for integration with other software programs, including Microsoft Outlook and Google Drive.

Regarding ease of use, we found the program challenging to set up the system plan. However, after exploring the logic of the program's design, we found that many of the features were intuitive. One of the program's disadvantages mentioned in reviews is the steep learning curve for people who are inexperienced in using planning platforms (Stan, 2022).

Whether the project is developing digital solutions, designing and implementing health programs, building a road, or creating an educational program, four phases are typical to project management: project planning and scheduling, team collaboration, time tracking, and reporting. In this next section, we discuss the use of project management software in each of these phases.

Planning*:* The planning phase is when the project plans are designed and developed, documented, the deliverables and requirements are defined, and the project schedule is created. This stage involves creating a set of plans to help guide the team through the formation, implementation, and closure phases of the project. The planning phase involves defining stakeholders, defining roles, setting goals, defining deliverables, listing and prioritizing tasks, identifying resources and team member assignments, creating schedules with milestones, and defining modes of communication. The ClickUp program has numerous templates to facilitate the process of planning. Among the templates included is one for Agile Project Management. Additionally, once a program management system has been created, the information for one project can be saved as a template for planning similar future projects or copied into a new folder for use as a foundation for facilitating a new project.

Scheduling: In producing CCT solutions, scheduling involves developing timelines for various team members, such as multimedia specialists, UX designers, software developers, and business analysts. Equipment and materials for the project must also be identified and procured at a particular time. Developing a system for project management software addresses "what" is to be delivered, "when" tasks for delivering the project will be performed, and "who" is responsible for the assignment of the appropriate resources needed to complete the project by the targeted deadline. Figure 1 shows a Gantt Chart of project activities of who is responsible for what and the order tasks and subtasks are to occur. This allows the project manager and team members to see who is accountable for each task.
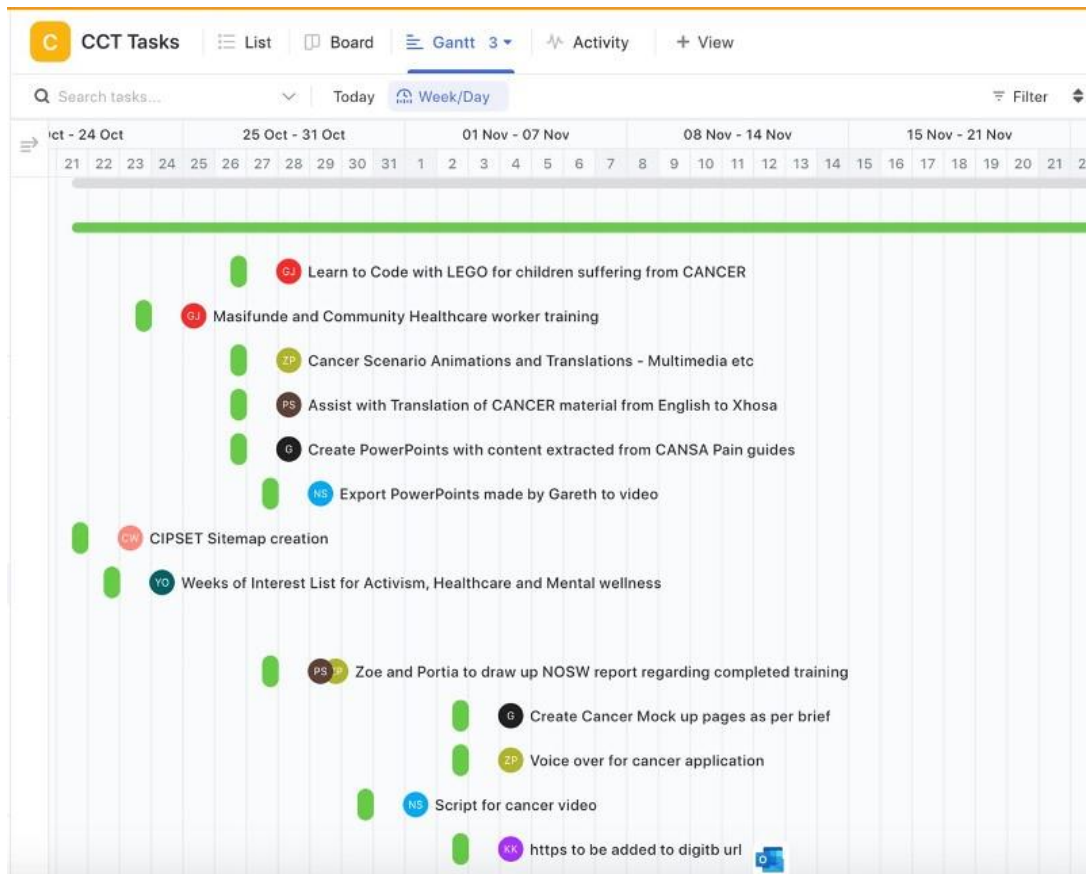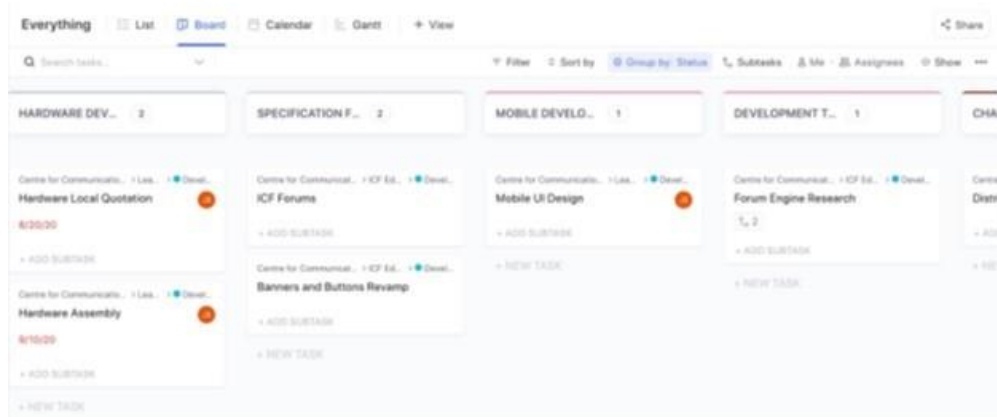
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Figure 1. Project Gantt Chart

Figure 1 shows how the program automatically compiles a Gantt Chart of project activities. The top of the chart in Figure 1 shows how the program can display programs by day or week. The green symbol shows how the program enables overall monitoring of all project milestones and deliverables. Thus, allowing the viewing of project activities and time tracking in real-time in relation to scheduling. The scheduling of team members is displayed by the coloured circles that indicate the individuals assigned to a task. Due dates can be altered by the project manager or the person assigned to the task. Reminders of tasks are automatically sent to assignees. Thus, if a team member changes a due date, the project manager is notified and can respond appropriately.
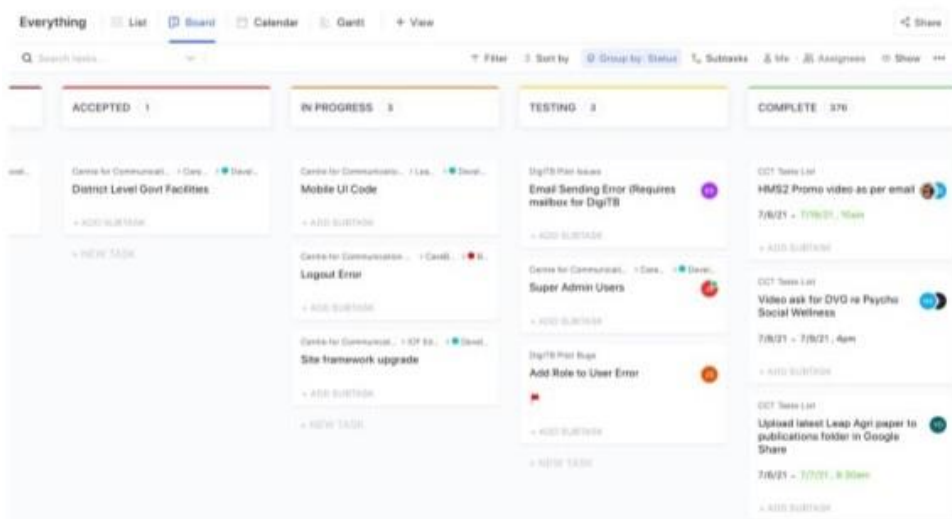
Team collaboration: Figure 2, shows a dashboard, i.e., a board, that allows information to be displayed for simultaneously monitoring different activities, which facilitates team collaboration.

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Figure 2. Simultaneously monitor different projects and stages

Figure 2 shows four activities: hardware development, specification form, mobile development, and development tasks. Tasks for each activity are listed in the column under the activity. Under Hardware Development is listed as local hardware quotation and hardware assembly. Similarly, under Specification Form, the task for developing ICF Forms, Banners and Buttons Revamp is displayed. Under Mobile Development, the task Mobile UI design is listed.

Tracking: Figure 3 displays how the program allows the project manager to monitor and track the progress of completing a task and the time for completing a task. The program also allows displaying each task's status (i.e., accepted, in programs testing, and complete).

Figure 3. Feature for monitoring the status of all projects

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Note that the label for status can be customised for specific actions, such as" review" and "revise." Users can also make comments and attach documents for a task. Figure 4 shows that the program can display and track issues that arise during user testing, piloting, and development of technological innovations.
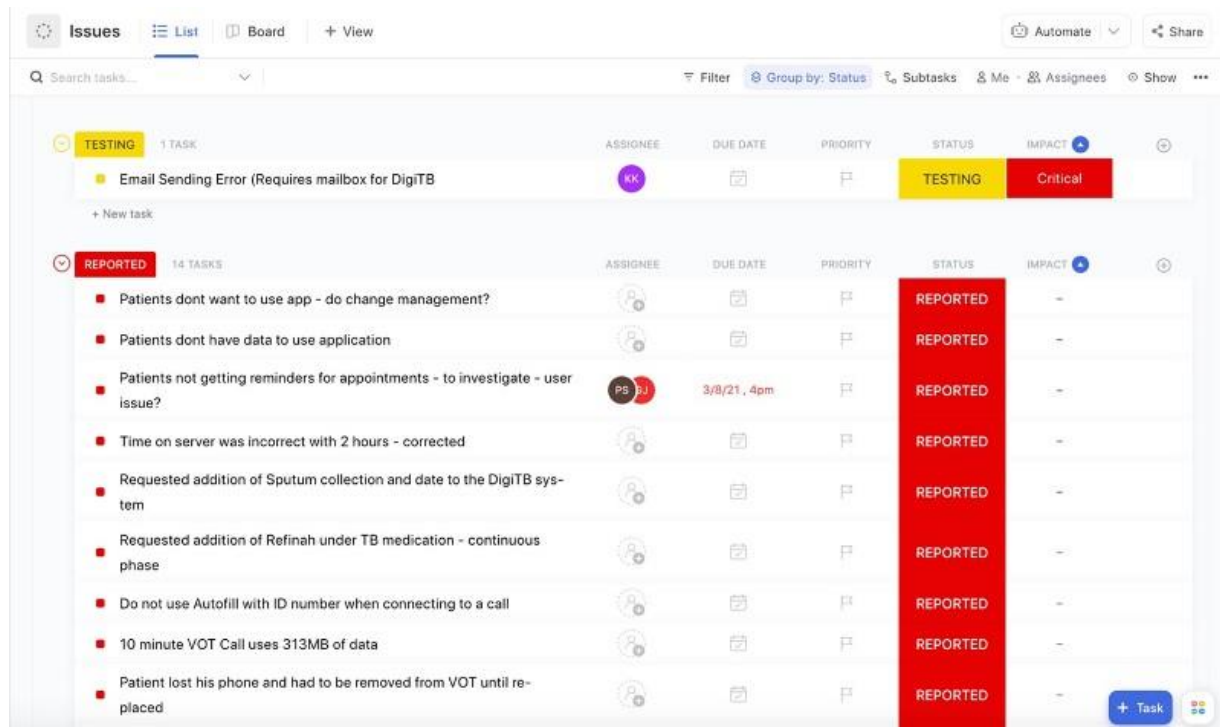
Figure 4. Feature for tracking and documenting information for closeout

Reporting: The last phase of project management is a closure or close-out. Project management software is an invaluable tool for the termination phase of the project's lifecycle. The program can ease compiling information for final reports, and provide documentation on cost baseline, work breakdown structure (WBS), lessons learned and milestone analysis (Patanakul et al., 2010).

V. Discussion

The benefits of project management software include uniting project planning, resource management, team collaboration, time tracking, and reporting, which allows the project manager to traverse different project stages efficiently. Project management software allows the project manager to define and gather requirements from stakeholders, thus ensuring clear expectations and objectives and minimizing output deviations from the expected results. Project management

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software standardizes communication so that everyone (stakeholders and team members) is on the same page. Research reveals that successful project management practices must be based on the shared cultural values of team members and stakeholders (Eberlein, 2008; Kendra & Taplin, 2004; Loosemore, 2003).

There is general agreement in the literature that project managers need to have direct contact with team members to communicate successful strategies and reinforce best practices (Fisher, 2011). Project management software allows the projects' needs and requirements to be conveyed clearly to the team members (in-house and remotely).   Project management software should be used to complement rather than be a replacement for team meetings. Time constraints are an ongoing problem in the process of developing ICT solutions. Project management programs can aid in minimizing unrealistic deadlines, which can subsequently help reduce pressure and minimize problems during the development process.

A significant challenge to managing projects is changing requirements and priorities. The needs of clients may change as the project progresses consequently, extra time, costs, and resources must be allocated that will further impact the completion of the project. Project management software allows the project manager to adopt the Agile methodology to better respond to changing project requirements. If requirements change, project management software can be an invaluable tool in implementing new priorities quickly and easily.

Poor communication with clients, other stakeholders, and the development negatively affects project outcomes. Miscommunication with clients and stakeholders prevents the development of clear requirements, which consequently impacts the working process. Additionally, poor communication can lead to conflicts within the team. The lack of communication among team members can lead to overlapping roles and responsibilities. Project management software facilities the flow of information through the project managers, thus reducing miscommunication among team members.

Keeping everyone on the same page is crucial for a successful project. This can become challenging for the project manager since individual team members have different skills, which are needed at varying times. Project management software can keep everyone up-to-date and on schedule. Additionally, unrealistic expectations and tight deadlines can demotivate team members. Project management software allows the project manager to set realistic deadlines and expectations that can be modified, if needed, by team members as conditions and requirements may change.

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VI. Factors to Consider

There are numerous lessons that we have learned from our experience in using project management software. We have grouped the main points into three categories: environment, motivation, and training.

Environment

The environment is a crucial factor for the type and features of a project management software program. A study by Liberator and Pollack-Johnson (Liberatore & Pollack-Johnson, 2003) identified factors influencing the usage and selection of project management software. The size and complexity of projects influence project managers' use of project management software. Older industries with a strong history of project management (construction and engineering services) make heavier use of the more high-end packages (such as PENTA or EADOC). In contrast, the newer, more technological industries (computer software/data processing and telecommunication services) make heavier use of the simpler, less-expensive packages (such as Monday or ClickUp).

Motivation

Project management software requires a commitment by the team members and, more importantly, by the project manager to use the tool effectively. Ali and colleagues (2008) surveyed 497 project management professionals to identify factors that affect the acceptance of project management software and the perceived impact of software usage on their performance. The study findings revealed that quality information and greater project complexity were the overriding factors explaining higher levels of system utilization. Greater system functionality and ease of use have a significant positive relationship with increased software utilization, and a positive relationship exists between higher usage of project management software and perceived project managers' improved performance.

Training

The increase in digital technology and information systems makes people more comfortable using software technology. Still, the project manager and team members need specific skills to use project management software effectively. The groundwork necessary to learn and modify systems for project management software takes time. ClickUp provides a wealth of tutorials, and instructional videos are also available on the web.

VII. Conclusions

In summary, project management software is a tool that enhances the ability of project managers and their teams to achieve a positive outcome. There is a link between the performance of a project and the level of use of project management software. The advantages of using project management software increase efficiency while decreasing the time and effort needed to develop and deliver successful initiatives.

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