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Review

Project management: importance for diagnostic laboratories

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ABSTRACT

Background: The need for diagnostic laboratories to improve both quality and productivity alongside personnel shortages incite laboratory managers to constantly optimize laboratory workflows, organization, and technology. These continuous modifications of the laboratories should be conducted using efficient project and change management approaches to maximize the opportunities for successful completion of the project.
Aim: This review aims at presenting a general overview of project management with an emphasis on selected critical aspects.
Sources: Conventional project management tools and models, such as HERMES, described in the literature, associated personal experience, and educational courses on management have been used to illustrate this review.
Content: This review presents general guidelines of project management and highlights their importance for microbiology diagnostic laboratories. As an example, some critical aspects of project management will be illustrated with a project of automation, as experienced at the laboratories of bacteriology and hygiene of the University Hospital of Lausanne. It is important to define clearly beforehand the objective of a project, its perimeter, its costs, and its time frame including precise duration estimates of each step. Then, a project management plan including explanations and descriptions on how to manage, execute, and control the project is necessary to continuously monitor the progression of a project to achieve its defined goals. Moreover, a thorough risk analysis with contingency and mitigation measures should be performed at each phase of a project to minimize the impact of project failures.
Implications: The increasing complexities of modern laboratories mean clinical microbiologists must use several management tools including project and change management to improve the outcome of major projects and activities. **A. Croxatto, Clin Microbiol Infect 2017;23:434**

Introduction

The constant need for diagnostic laboratories to improve quality and productivity while reducing turn-around-time (TAT), alongside constraints of personnel shortages and limited funding, implies that lab managers must constantly rethink the laboratory workflow and technology to optimize the laboratory organization and performance. The approach of project management provides a methodology to face the requirement to evolve and adapt diagnostic laboratories to the market and system constraints in a more and more complex diagnostic environment. Project management offers a rigorous approach organized in multiple phases for achievement of defined goals while reaching success criteria and respecting the budget, allocated human resources, time frame, and quality. However, as outlined by Munns and Bjeirmi, there are clear distinctions among project, project management, and project outcomes [1]. They defined the project as being the achievement of a specific objective, whereas project management is the process of controlling achievement of the project objectives. Thus, in the worst case, a project can be successfully achieved even with a management failure, and vice versa [1]. A project is carried out by a team under the supervision of a project leader, whose goal is to transform ideas and thoughts into a completed project characterized by three main characteristics: quality, costs, and time limit. To be useful for diagnostic microbiology laboratories, this review is illustrated by a project of automation in bacteriology to discuss practical steps of project management, including the importance of communication,

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reporting, and change management. Automating a diagnostic laboratory is complex, disruptive, time-consuming, and labour-intensive, and requires appropriate and efficient project management to guarantee that the project does not result in suboptimal performance, exceeding costs and time delays. Thus, we present in this review the design of a project based on the HERMES 5 model [2], characterized by a phased management approach. Note that the present article does not focus on the specifics of project management, but rather shares the authors' experience in project management applied to a large automation project affecting a diagnostic laboratory.

Phases of the project

A project is usually delimited by several phases and milestones, which structure the project during its lifecycle. Depending on the phase model, a different number of phases corresponding to different aims, actions, tasks, and activities can be used. Moreover, the name and activities of each phase can be interpreted in multiple ways by different users. As an example, a phase model such as HERMES [2] consisting of four phases is presented in this review. The four phases, initiation (exploration), conception (planning, design, and choice), implementation (execution and construction), and deployment (up to completion) are regulated by several milestones that represent project decision nods (Fig. 1). The milestones represent gates to allow or not transition to the next phase, based on the project status, quality, feasibility, execution, and its compliance with the strategic objectives of the core organization following intermediate phase reports by the project manager. Each phase of a project is characterized by a given number of tasks that determine the action and the activities that must be accomplished to achieve the aim of a project, hereafter called 'results' (Fig. 1). The results can be technical, organizational, functional, managerial, product-orientated, descriptive, and educative. It is important for a project manager to monitor planning of the tasks, which can be done using a GANTT or PERT diagram. For example, the GANTT diagram illustrates a project schedule that monitors the start and finish date of the different tasks and/or activities composing a project. It is thus possible for the project manager to identify quickly the limiting actions, that is the components of the project that are delayed or must be started early and for which actions must be taken to ensure a constant progression of the project to reach the objectives on time.

In theory, a project can be terminated at any phase if the objectives cannot be achieved on time with the human, material, and financial resources allocated for this project. Usually, the decision to release a phase is made by the project and core organization (project steering committee). An example of project phases applied to laboratory automation is depicted in Fig. 1. Hereafter, we discuss several key aspects of project management listed in the four phases that we consider to be essential for the success of a large project such as laboratory automation. In addition, we discuss risk analysis, an additional key aspect of project management that must be considered throughout the entire project.

Initiation

During the initiation phase, an analysis of the situation is performed by defining general requirements, objectives, context, scope, and risks. Various options are proposed and one solution is chosen. A project charter and a project management plan are prepared and submitted for approval to the core organization. Upon

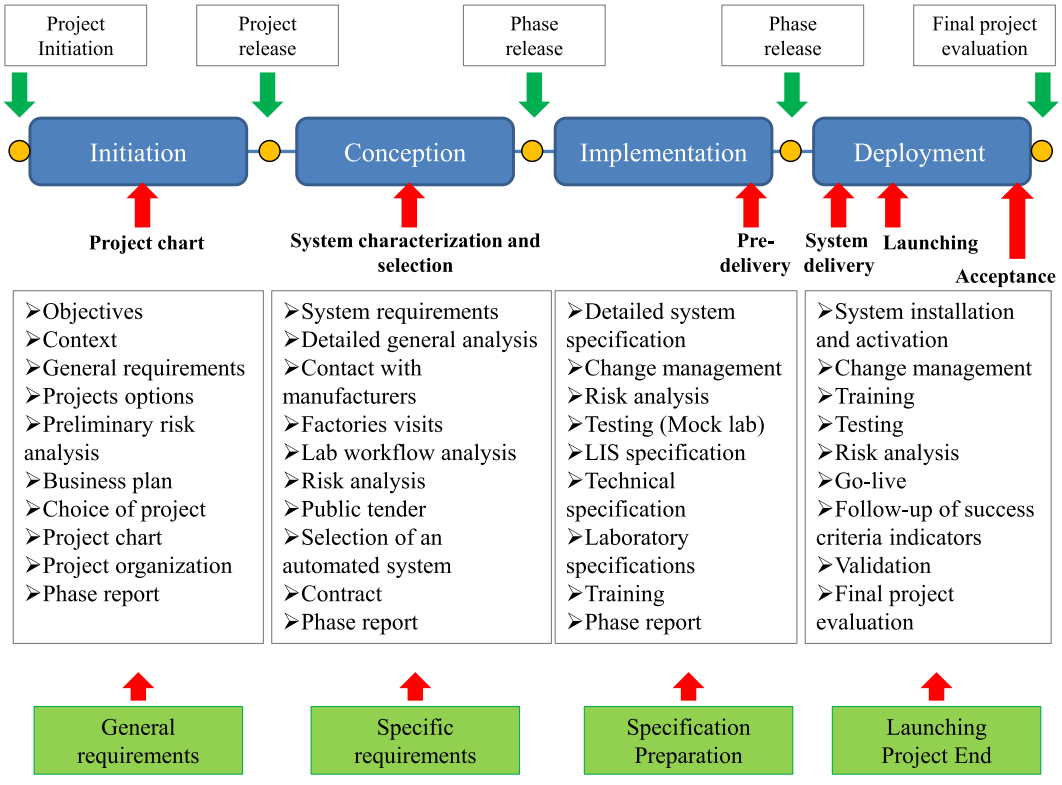

Fig. 1. Project phases with examples of tasks and activities that could be defined in a project of automation of a laboratory of bacteriology. Each phase is delimited by milestones representing security gates ensuring the appropriate progression of the project, allowing or not a phase release to the next phase based on phase reports of the project manager. However, additional multiple project status reports should be performed during each phase of the project from project management to the steering and the core organization. The project starts upon acceptance of a business plan by the core organization and ends with a final project evaluation. Adapted from HERMES 5 [2].