

Pathfinder: A Project Management Framework for Academics

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Abstract. A project management framework developed for academics would allow academic researchers, no matter their level of experience or area of discipline, to manage their projects more effectively and efficiently. Current predictive, hybrid, and adaptive project management frameworks were mostly designed for business teams, while many academic researchers generally manage their projects individually. Therewith, current project management frameworks do not provide adequate guidance on how to manage an academic research project. For this, I propose a solution, called Pathfinder, which is a pre-tailored, lightweight project management framework which is quick and easy to learn, simple to implement and adapt, and scalable.

1. Introduction

Academic researchers are usually not trained to manage projects even though they work on projects daily. The reason for this gap is how academic projects are distributed: An academic team usually consists of junior and senior academic researchers as well as supporting staff such as technicians. In most cases, students, postdoctoral fellows, and other junior researchers work as one-person teams on projects which include writing manuscripts for peer-reviewed publication, conducting lab work, or applying for funding.

While academic researchers are trained by the universities to conduct research of their own, to interpret their data sets, or to write technical manuscripts, little effort is directed at adequate training to actually enable them to manage projects.

Current project management frameworks are complex, require pre-existing experience in project management, and take a lot of time to learn and understand. It also takes time and experience to get a comprehensive overview on the project management landscape. Only experienced project managers have the knowledge and capabilities to use existing frameworks, processes, tools, techniques, and principles to tailor them towards a project's unique need.

However, not many academic researchers can find the time to acquire such knowledge. Hence, many academics would benefit from a project management framework that is quick and easy to learn and powerful enough to increase the effectiveness of the researcher to deliver value immediately.

In the following, I propose a lightweight, pre-tailored project management framework that academic researchers can implement and adapt at any stage of an academic research project.

2. Framework

The proposed framework is adaptive to frequent changes, designed to navigate complexity, and reduced to only include those elements necessary to manage academic projects. This framework converges at the intersection of Agile and Lean: on the one hand, its iterative and incremental format follows Agile frameworks, but with no need for customer interaction or product development. On the other hand, the Pathfinder framework provides more guidance than those of Lean principles, such as eliminating waste, optimizing the whole, and delivering rapidly. The two main factors of the Pathfinder framework are that: (1) it must be easy to understand and (2) it must be easy to implement at any stage of a project life cycle. With these attributes, academic researchers can learn and apply the Pathfinder framework as quickly as possible to provide value as early as possible.

The framework builds up like a board game on which a ‘meeple’ moves from square to square and completes actions. The framework itself reads like a game manual that encompasses different roles, a set of tools and techniques, and a set of rules (Fig. 1). This game-style setup should accelerate learning.

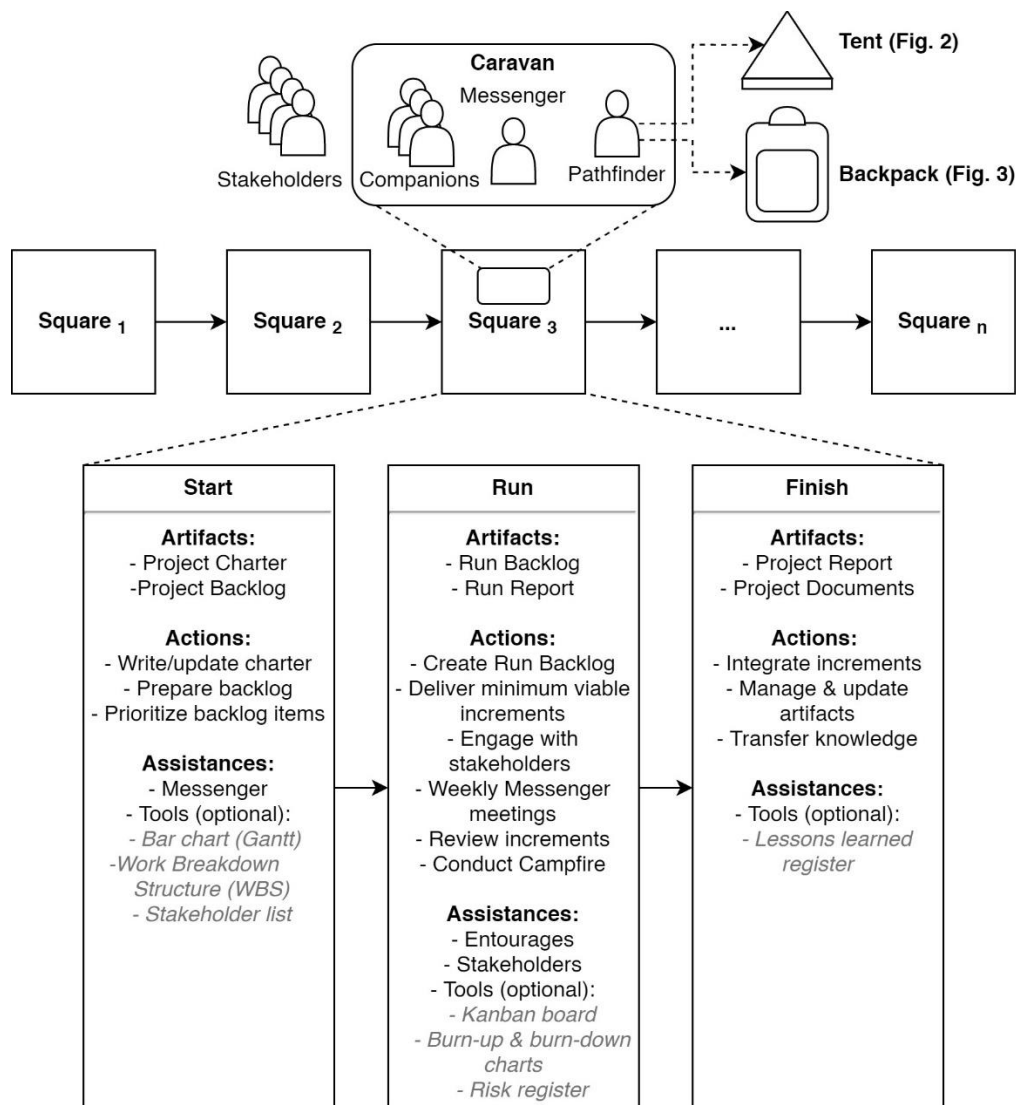


Fig. 1: The Pathfinder project management framework.

3. Caravan and Stakeholders

The Caravan describes the team (e.g., a lab team). The Caravan encompasses three roles: the Pathfinder, the Messenger, and the Companions. Outside the Caravan are external stakeholders (described here as Stakeholders for simplicity).

Pathfinder

The Pathfinder is the academic researcher who is also the project manager (e.g., a student or postdoctoral fellow). The Pathfinder is equipped with a Tent of mindset, principles, and values (Fig. 2) and a Backpack filled with tools and techniques (Fig. 3).

Messenger

The Messenger is the academic supervisor of the Pathfinder and the Companions who will approve, support, and oversee project work (e.g., faculty member or professor).

Companions

Companions refer to members of the academic team or lab but may not have a direct interest in the outcome of the Pathfinder project (e.g., fellow students, postdoctoral fellows, or technicians). However, they may be supportive of the Pathfinder project and be able to help more than external stakeholders.

Stakeholders

Strictly speaking, stakeholders include anyone who can positively or negatively affect a project. This group would also include the Messenger and the Companions. In this framework, Stakeholders only include people who are not part of the Caravan but can still influence a project.

4. Squares

The Square is the heartbeat of the Pathfinder framework. Each Square is 2 – 4 weeks in duration, and consists of 3 events: Start, Run, and Finish. In each event there are artifacts, actions, and assistances (Fig. 1). When a Square has been completed, the next Square starts immediately.

Start

At the Start, the Pathfinder must write or update a comprehensive Project Charter that outlines the project and includes a high-level overview of the project goal, scope, deliverables, responsibilities, resources, quality, schedule, stakeholders, success factors, risks, and required work. The next step is to write or refine the Project Backlog. The backlog consists of all the work required to complete the project, and it may need to be subdivided into smaller pieces of work. It should complement newly identified work as the project progresses. Here, the Pathfinder must prioritize or re-prioritized work items together with, or under the supervision of, the Messenger, who may approve the Start and subsequent events. The Pathfinder may use a set of optional tools and techniques to help craft the artifacts and to perform the actions (see section 6 for more details). Except for the very first Start which can take 1 to 3 days (initial planning of the project), this event should take 2 – 4 hours.

Run

The Run immediately follows the Start and deals with the actual project work. First, the Square Backlog must be organized into a logical sequence that takes work items, starting with the items of the highest priority, from the Project Backlog. Completion of all work items in the Square Backlog should be possible within the 2 – 4 weeks Square duration. The goal is to provide a minimum viable increment that provides value at the end of the Square. If too much or too less work items were ordered into the Square Backlog, it must be noted in the Run Report in order to improve the workload in subsequent Squares. Other information to note in the Run Report include risks, constraints, and assumptions identified during the Run which will help to improve subsequent Squares. Progress should be tracked, risk monitored, and Stakeholders and Companions engaged on a continuous basis. The use of an information radiator (see section 6) helps to maintain an overview and thus control of the project.

Messenger and Pathfinder should meet weekly for 30 minutes to discuss the Square progress and review the increment of work accomplished at the end of the Run. The increment review should take less than 2 hours and notes must go into the Run Report. At the end of the Run, the Pathfinder will also conduct a 30-minutes to 1-hour Campfire session (an open and informal meeting) to reflect on what went well and what did not. This meeting between the Messenger and Pathfinder should extend invitations to Companions and Stakeholders even if they were not involved with the work because they could increase the quality of the project. Findings of the Campfire go into the Run Report.

Finish

On the Finish, the existing Project Report must integrate the work (e.g., a PhD thesis), as must Project Documents (anything else of value that does not go into the Project Report, e.g., Standard Operating Procedures – SOPs). At this stage, the Pathfinder must update all documents, repositories, and processes; the Run Report can help to identify what needs to be updated or improved. Updating the Project Charter (if necessary) leads straight to the beginning of the next Square. The Finish event takes 4 – 8 hours.

5. Mindset, Principles, and Values

The Pathfinder Tent is built on empiricism and lean thinking, works within a frame built with adaptation, transparency, and accessibility, and houses seven different values (Fig. 2). Those principles and values determine the Pathfinder mindset. The following provide the definitions of each principle and value in the Pathfinder context.

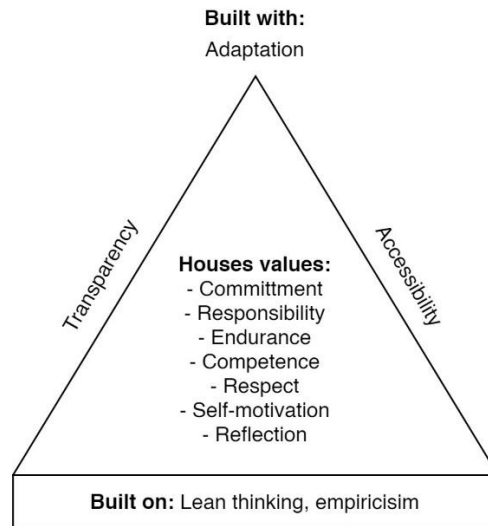


Fig. 2: The Pathfinder Tent of mindset, principles, and values

Built with:

- *Adaptation* – the process to change project work to become suitable to a new state of a project.
- *Transparency* – the quality that makes a project easy to understand and open for inspection.
- *Accessibility* – the quality of information being easy to reach and use.

Built on:

- *Lean thinking* – a methodology to organize activities in order to focus on delivering value while eliminating waste in order to continuously improve the framework's workflow.
- *Empiricism* – the practice of relying on observation and experiments to implement and act on lessons learned to tailor the framework towards the project's unique needs.

Houses values:

- *Commitment* – the attitude to focus on work to advance the project.
- *Responsibility* – the state to act on, and stand up for, one's own.
- *Endurance* – the ability and strength to overcome project obstacles.
- *Competence* – the state of having—or acquiring—sufficient knowledge, judgment, and skill to conduct a project.
- *Respect* – the act of giving particular attention to treat people (including oneself) in an appropriate way.
- *Self-motivation* – the initiative to conduct a project without encouragement or supervision of another.
- *Reflection* – the ability to consider and evaluate past actions that affected the project.

6. Tools and Techniques

The Pathfinder Backpack is a starter pack of tools and techniques the Pathfinder may use to progress the project (Fig. 3). Pathfinder beginners should start with the tools and techniques presented here, while Pathfinder experts can adapt the Backpack with other tools and techniques to accommodate a project's unique needs. However, limiting the Backpack to 10 tools and techniques will help to minimize framework waste.

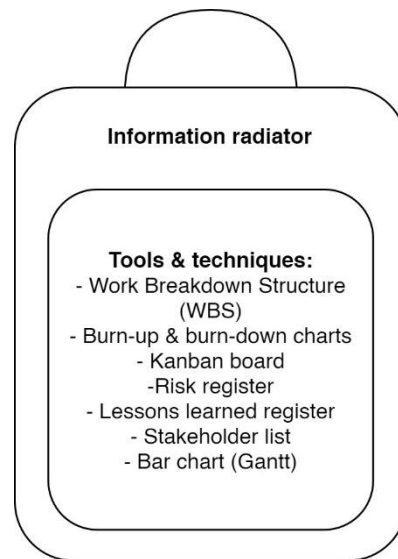


Fig. 3: The Pathfinder Backpack, a starter pack tools and techniques

Information radiator

A display of all latest project information at a glance in a highly visible location (e.g., white board in front of the main work desk). This is the only mandatory technique in the Pathfinder framework because the use of an information radiator increases adaptability, transparency, and accessibility, the building materials of the framework. This tool provides an overview of the project.

Work breakdown structure (WBS)

A hierarchical decomposition of the total scope of work to be carried out. Use to manage scope, costs, and risks as well as to get an overview of the project. Can be included in the Project Charter and as input for the Project Backlog.

Burn-up & burn-down charts

Charts that track the amount of backlog items the Pathfinder has completed across a Square and/or the whole project. Use to manage schedule, scope, and cost. Can be included in the Project Backlog and/or Run Report.

Kanban board

A visual workflow board consisting of multiple columns. Each column represents a different project state. Work items in progress should be limited. Use to manage schedule, quality, resources, and costs. Can be included in the Project Backlog and/or Run Report.

Risk register

A repository of identified risks (threats & opportunities) which are evaluated on their impacts and probabilities, and responses on how to deal with them. Use to manage risks. Can be included in the Project Charter (high-level) and/or Run Report (detailed)

Lessons learned register

A document to record knowledge gained during the project so that it can be used to improve subsequent Squares and the overall framework processes. Use to manage risks, quality, and integration. Can be included in the Run Report.

Stakeholder list

A document that identifies all project stakeholders, including the Messenger and Companions, and classifies, categorizes, and assesses them. Use to manage stakeholders and communication. Can be included in the Project Charter.

Bar chart (Gantt)

A display of schedule-related information. WBS components are listed over time. Use to manage scope, cost, and schedule as well as to get an overview of the project. Can be included in the Project Charter. A WBS may be used as an input.

7. Considerations

Other use cases

While developed for academic researchers who work in small teams on projects by each themselves, the Pathfinder framework may be suitable for small collaborative teams (e.g., for a team of 2 people or in a start-up) and small, short-lived projects. It may also be used in program and portfolio management where managers do not have a team and perform administrative tasks individually.

Lean development

As this framework was developed with—and is based on—lean thinking, it will likely evolve (e.g., to further eliminate waste). While the content of this white paper may be outdated at some point in time, the motivation for the development of this framework will not change. The content of this white paper should then be seen as an historic landmark in academic project management.

Scaling

The Messenger can house several Pathfinders in the Caravan, but for a given Pathfinder the other Pathfinders form part of their Companions. This way, the Messenger can manage programs that consist

of one or more projects. The Messenger can also be a Pathfinder, e.g., using the Pathfinder framework to manage other Pathfinders, but would then need to have a Messenger as well (e.g., the department head).

Tailoring

The Pathfinder framework equips academic researchers with a solution to improve how they manage their projects and do so more effectively and efficiently. With knowledge gained through this process, they may identify pathways or adapt other tools and techniques in order to make this framework even more efficient for their work. But the Pathfinder must be careful when making such changes noting that they could reduce the efficiency of the framework ('verschlimmbessern').

Similarities to other frameworks

The Pathfinder framework has similarities to other frameworks; especially frameworks such as Scrum, eXtreme Programming (XP), and the Waterfall model inspired the Pathfinder framework. Thus, a few events and roles also exist in other frameworks and are listed in Table 1.

Table 1: Scrum vs. eXtreme Programming (XP) vs. Pathfinder: similar events and roles.

Scrum	XP	Pathfinder	Definition
Sprint	Iteration	Square	Fixed-length period of time
Release	Small release	Minimum viable increment	Release to production/integrate
Sprint/Release planning	Planning game	Start	Planning meetings
Product Owner	Customer	Messenger	Project representative
Retrospective	Reflection	Campfire	"Lessons learned"-style meeting
Scrum Master	Coach	Pathfinder	Project manager
Development Team	Team	Convoy	Project team
Daily scrum (15 min)	Daily standup	Weekly messenger meeting (30 min)	Brief status meetings

8. Conclusions

This white paper serves as the foundation of the Pathfinder project management framework, a solution designed predominantly for academic researchers but potentially of use to others. The framework converges at the intersection of Agile and Lean. It offers a game-style learning experience to boost understandability and implementation: the framework identifies different roles, a set of tools and techniques, and rules that a Pathfinder must follow to gain its full benefits to successfully complete a project efficiently. This white paper may get outdated as Lean thinking and customer feedback will advance the Pathfinder framework, leaving this paper as a historic landmark in academic project management. Therefore, this white paper is expanded into a more detailed and regularly updated practice guide available at www.pathfinder-academy.org.