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# Scaffolding Project-based Learning through Project Management Best Practices

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One of the most common challenges project-based learning faces in universities is the homogeneity of knowledge and skills which comprise most student project teams (Harmer, and Stokes, 2014). Typically, project teams are formed from within the same

class of students or academic program. This results in a uniformity of project team expertise which, although strong in certain respects, is lacking the diverse talent which is often needed to ensure a high quality project outcome.

In 2014, Brock University's Centre for Digital Humanities launched the Brock University Design Studio (BUDS) ([brocku.ca/buds](http://brocku.ca/buds)) which is designed to mitigate this challenge, providing students with the opportunity to work in the kinds of diverse project teams they are likely to encounter out in the workforce (Brooks and Holmes, 2014; Davidson, 2014). Mandated to bring students from different academic programs together in order to form collaborative teams, BUDS provides students across the university with course-based opportunities to practice and hone their knowledge and skills within a real-world, collaborative, project-based production studio context. BUDS' projects are sponsored by community partners that are external to the Centre for Digital Humanities.



# The Project Management Standards

The BUDS initiative integrates project management best practices into students' project-based learning coursework. As the Director of the BUDS program, I draw on my background as a certified Project Manager Professional (PMP), a certification which is maintained by the Project Management Institute (PMI). My scholarship of teaching and learning work focuses on the meaningful ways through which to re-apply the project management standards - largely contextualized within business-centric examples - to higher education contexts. (Notably, the charitable arm of PMI pursues a similar focus. The Project Management Institute Educational Foundation (PMIEF) publishes project management resources for teachers (PMIEF, 2014; Trilling, 2014). However, most of the organization's resources are K-12 oriented.)

Project management is a collection of standards, tools, and best practices which help individuals and collaborative teams achieve their project goals. The project management standards maintained by PMI (2013) focus on five process groups which roughly correspond to the stages of project-based learning. They are listed below, along with the phrases I use to contextualize each process group to students:

- **Initiate:** Summarize an idea for a project;
- **Plan:** Detail the plans for a project;
- **Execute:** Carry out a project;
- **Monitor and Control:** Manage the progress of a project;
- **Close:** Bring a project to an end.

In my project-based learning coursework, I particularly focus on the importance of the planning phase of a project,



including the need to clearly define the rationale for a project (*why is this project important?*), the audience for a project (*who is this project intended for?*), the scope of a project (*what is included/excluded from the project?*), and the criteria for project success (*this project will be successful if...*).

## The Proposal Brief Template

At times I ask students to fill out a formal project proposal brief using a template which I developed. In addition to the above components, the template includes the following sections:

- the list of **deliverables** (both final and formative) and the date each is due. Deliverables include the final product plus early iterations of the product, as well as progress reports and other interim deliverables as appropriate;
- the list of **project team members**, their contact information, and project role descriptions;
- the list of **additional stakeholders** who have impact over or are influenced by the project. For each stakeholder, I ask students to identify whether he or she is *responsible* for a project component, *accountable* for a project component, needs to be *consulted* on a project component, or needs to be *informed* at the appropriate time about a project component. (These tags are referred to as the RACI matrix in the project management standards.);
- the list of **resources** that are required for the project, including facilities, technologies, and materials.

The proposal brief template also includes space for a **work breakdown structure** which is a hierarchal breakdown of the project into its discrete tasks.



There is also space for a **Gantt chart**. A Gantt chart is a multi-level timeline in which dates run along the top and a list of tasks run along the left-hand side. Coloured bars on the chart graphically represent the start and end points of tasks, a number of which may run concurrently. As appropriate,

The research shows that project-based learning succeeds when students continuously monitor the progress of their project, especially quality, risk, and time.

students are asked to add a D, R, or M tag to the end of a task bar to indicate whether the completion of the task results in a deliverable or a report or is a milestone point in the project.

## A Project-based Learning/ Project Management Conceptual Model

Referring back to the five project management process groups introduced earlier, I also emphasize to students the importance of the monitor and control processes which should be ongoing throughout the executing phase of a project. The research shows that project-based learning succeeds when students continuously monitor the progress of their project, especially quality, risk, and time, modifying the project as warranted (Harmer and Stokes, 2014).

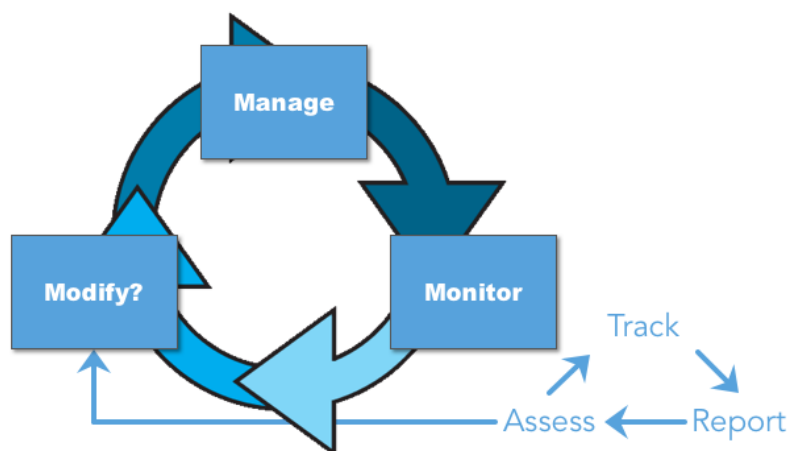
Drawing on the project management standards, I have developed the Triple-M Cycle (see figure) which comprises the processes of managing, monitoring, and modifying (Hutchison, 2016).

The monitoring sub-processes are:

1. **Tracking:** A documentation process. The project team, on a continuous basis, records its progress, using a carefully selected toolset of text and graphic organizers.



2. **Reporting:** A communications process. The project team conveys its progress to one another and, equally importantly, the instructor and project sponsor.
3. **Assessing:** An evaluation process. Judgments are formed about the project's progress, with particular reference to product quality and time management. As warranted, modifications are made to a project.

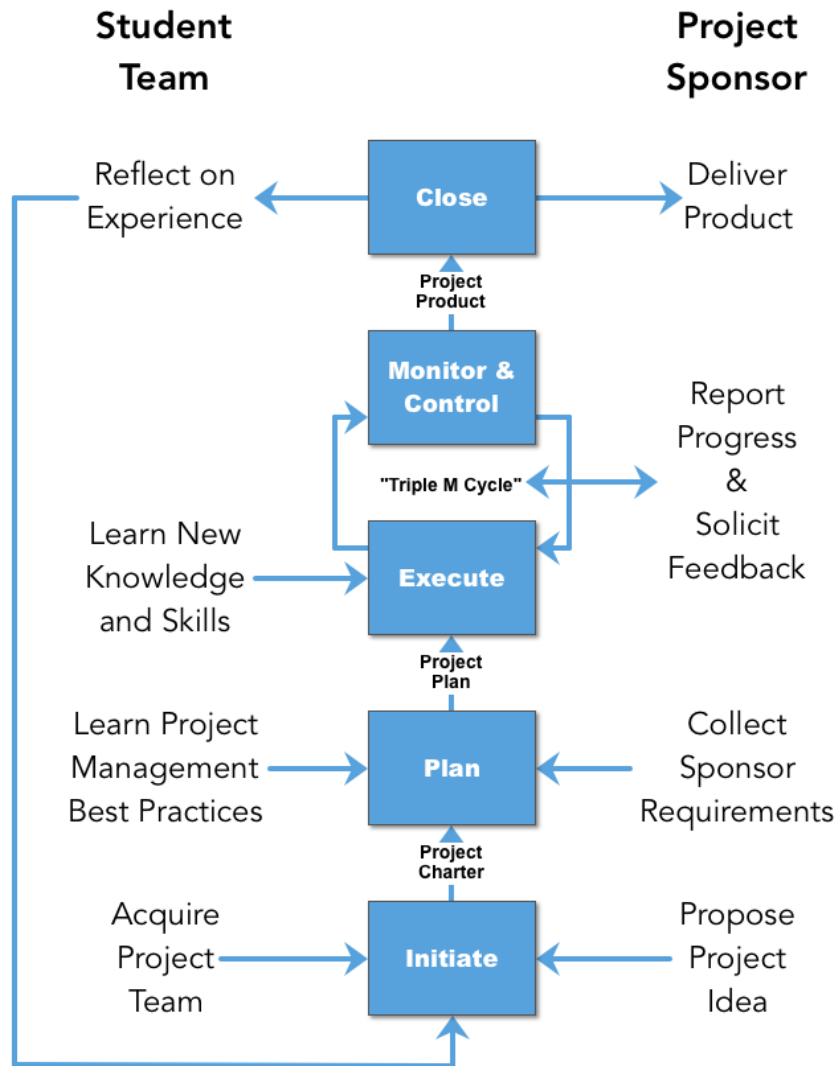


Incorporating the Triple-M Cycle, the Project-based Learning/ Project Management (PBL/PM) pedagogical framework I have developed (see figure) aligns a student team's project work to the project management process groups introduced earlier. As they plan a project, students learn a set of key project management skills. As they execute a project, they solicit the feedback of the project sponsor. As they close a project, they reflect on their project work from a service learning perspective. The students also apply lessons learned to new project experiences.

The PBL/PM pedagogical framework graphically represents the flow of interactions between a student team and a project sponsor throughout the project lifecycle. It is a project-based learning best practice that projects should be undertaken for



## Project-based Learning/Project Management Conceptual Model



Developed by: David Hutchison, PhD, PMP for [EduProject.org](http://EduProject.org)

Note: The initiate, plan, execute, monitor & control, and close process groups are detailed in the PMBOK® standard. They are referenced with the permission of the Project Management Institute.

an audience beyond the immediate class of students (Larmer, 2009). The pedagogical framework points to the key touch points along a project's lifecycle in which it is critical for a student team to connect with the project sponsor, soliciting their input.



In the model, the "acquire project team" and "collect sponsor requirements" processes (both formal project management terms) are essential. In terms of the "acquire project team" process, my project-based learning courses begin with a series of activities in which students from diverse academic programs get to know one another, learning more about the diverse skill sets and expertise individual students bring to the project. Along with ice breaker activities, I start with partner interviews in which pairs of students ask each other a series of questions. For example, "describe the most rewarding experience you have had in your program of study" and "What academic skills have you developed through your program of study that you would like to contribute to the project?"

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In terms of the "collect sponsor requirements" process, students meet early on with the project sponsor, usually only a week or two after the course has begun. In carrying out the "collect sponsor requirements" process, the students query the sponsor as to their specific expectations for the project and the product the project will produce. I encourage students to take detailed notes and to formulate questions that will assist the project team with their next steps in project planning. Importantly, this discussion with the sponsor is also an opportunity for students to articulate the limits as to what will be achievable with reference to the amount of time students can devote to the project and their levels of expertise. Over the ensuing weeks, students draw on their discussion notes to formulate a plan for the project, soliciting feedback from the sponsor and approval for the finalized project plan (which is always subsequent to change with sponsor support). The execution and monitor & control phases of the project then begin.



## Conclusion

As an instructor who teaches a number of project courses, I have found the project management standards to be immensely helpful in scaffolding the strategies I employ to plan my coursework and support students' project learning.

About a year ago, I hosted an inter-faculty roundtable at Brock University on the topic of project-based learning best practices. In attendance were colleagues from Business, Digital Humanities, Geography & Tourism Studies, Health Sciences, History, Sociology, and Learning Services. The richness of the discussion was punctuated by the shared realization that many of us were articulating similar successes and challenges, even as we implemented project-based learning in different ways and across diverse university programs.

Notably, there was wide agreement as to the importance of scaffolding student learning through project management best practices, particularly during the planning and monitoring & controlling phases of a project. The importance of allowing students ample time at the end of a project to reflect on their experiences, applying lessons learned to new project experiences, was also emphasized.

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## About the Author

David Hutchison, PhD, PMP is a Professor at Brock University where he is cross-appointed to the Faculty of Education and the Faculty of Humanities. A 2018 3M National Teaching Fellow, David is the Director of Brock's Centre for Digital Humanities. He is the Editor of EduProject.org.

## Discussion Questions

1. Which of the following project management processes typically receives the least amount of attention in student projects: planning, scoping, scheduling, role delineation, or risk mitigation?
2. Share with the group a project management strategy that you routinely employ or encourage students to employ.
3. Many projects (and not just student projects) are rushed to completion when time runs out at the end. What proactive strategies can project teams adopt to avoid this challenge well ahead of time?