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# Managing Risks & Constraints

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In project-based learning, planning for risks and constraints is a proactive measure that aims to avoid potential problems before they occur. During the planning process, it is important to clearly identify any risks and constraints related to a project. So too, the plans for effectively managing identified risks and constraints need to be clearly articulated.

## Risks

Risk is inherent to teaching and learning. For example, a lesson that is well received by one class of students does not go over so well the next period with another class. On the day they sit for a high stakes standardized test, many students are battling winter colds which distract from their focus. A 'snow day,' on which there are many student absences, threatens to disrupt a teacher's instructional plans for the days that follow.

The professional project management standards define a project risk as "an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives." (PMI, 2013, p. 310)

In education, conscientious planning aims to eliminate - or more realistically reduce - risk, which helps to ensure that educational objectives are achieved. For example, when planning a lesson, a teacher may try to predict everything that could realistically go wrong - novice teachers may even imagine a worst case scenario - in an effort to plan for every foreseeable contingency.

When it comes to risks, what is true of teaching in general is even more true of project-based learning - since the locus of control over learning rests, not only with the teacher, but also with students. Adjustments to instructional plans that would normally be articulated within a traditional unit or lesson plan - under the sole purview of the teacher - now need to be anticipated for within a student team's project plan.

In professional project management, the processes of identifying, evaluating, and planning for the potential risks a project might face is referred to as *risk management*.

## Risk Factors

Depending on their focus, student projects can face a wide range of potential risks. Risk factors include, but are not limited to:

- **budget**: e.g., a bake sale only makes a small profit resulting in insufficient funds to buy the materials needed to build a final deliverable;
- **grades**: e.g., a student's academic standing is jeopardized when they receive a low grade on their contributions to a project;
- **policy**: e.g., in accordance with school district policy, a field trip that is planned as part of a project must be cancelled due to an insufficient number of chaperones;
- **safety**: e.g., a project plan to build and launch a model rocket is abandoned out of concern that there is no safe place near the school to test the rocket;

The list at right focuses on predictable risks that are foreseeable and manageable with careful planning. However, school projects may also face unpredictable risks that are not foreseeable (Kendrick, 2011). For example, a key member of a project team may fall seriously ill and need to be absent from school for several weeks. Although unpredictable risks cannot be easily anticipated or planned for, they still need to be managed when they occur. In certain situations, a project may require a major modification.

- **scope**: e.g., the scope of a project that was launched in early June must be severely curtailed in order for the project to be completed by the end of the school year;
- **time**: e.g., a series of snow days disrupts the project schedule;
- **training**: e.g., a planned science experiment is placed in jeopardy because the project team is inadequately trained on how to use a required scientific instrument.

## Safety

Of the above risk factors, safety is by far the most important due to the fundamental need for schools to safeguard students at all times. While some projects will require very little in the way of safety precautions, others will require much careful thought and forward planning. Safety-focused risk management is particularly important for projects that feature:

- field trips to offsite locations;
- scientific experiments with hazardous materials or equipment;
- the production of products that require the use of potentially dangerous broad-based technology tools (e.g., woodworking or metal shop equipment).

For such projects, it is essential that the project team, under the close supervision of the teacher, draft a project plan that explicitly notes how the student team will address issues related to safety. School and classroom safety policies (or summaries thereof) should be provided early on to student teams that are contemplating projects with inherent safety risks. As well, it may be appropriate for the full class of students to receive instruction in the safety rules that must be followed in conducting projects where safety is a risk factor.

Safety is also an important consideration for projects in which students will interact - either face-to-face or online - with others outside of the school (e.g., external experts). Depending on the age and grade level of students, project proposals should take into consideration the need for students to be supervised by school personnel or parents during such interactions. For example, a Grade 7 project proposal that includes an unsupervised out-of-school meeting between a student and an external expert is very likely to be an unacceptable risk that needs to be amended to include parent or teacher supervision.

# Constraints

Just as projects face risks, they also face constraints. Constraints are defined as realities that limit or restrict a project in one or more ways. Constraints differ from risks because their impact on a project is a certainty from the start. Risks can potentially occur. Constraints are realities that must be respected.

Without a doubt, the most important constraint to school projects in an age of educational accountability is the need to ensure that projects are directly aligned with curriculum standards.

## Constraint Factors

Depending on their focus, school projects can be limited by a wide range of potential constraints. Constraint factors include, but are not limited to:

- **budget**: e.g., the plans to build a model rocket need to be scaled back as there are insufficient funds to purchase the required building materials;
- **facilities**: e.g., the schedule for a project needs to be changed in order to match the times a required computer lab is available for booking;

- **personnel**: e.g., the project schedule needs to be adjusted in order to accommodate the times an external expert is available to meet with students;

Note the school district policy example in the list of constraint factors at right. It is similar to a risk factor example listed earlier. Considered together, these examples point to how a project constraint, if left unidentified and unmanaged, can eventually become a project risk that jeopardizes the success of a project.

- **policy**: e.g., in accordance with school district policy, a planned field trip can only go ahead if there are a sufficient number of chaperones;
- **sponsor expectations**: e.g., the organization which is sponsoring a student team's project has communicated specific requirements for the final deliverable which need to be factored into the project plan;
- **time**: e.g., the plans for an ambitious project need to be scaled back as the project is starting very close to the end of the school year;
- **curriculum standards**: e.g., the topic focus of a project needs to be adjusted in order to more directly address the required curriculum standards.

## Risk and Constraint Management

Risk and constraint management entail three important project processes (PMI, 2013):

- identifying risks and constraints
- evaluating risks and constraints
- managing risks and constraints

## Identifying Risks and Constraints: Task List Review

During a project's planning phase, ask the student team to conduct a line item review of the task list it has itemized for the project. Encourage the team to pay close attention to each of the following categories of risks and constraints, as well as any others which apply to the project:

- **training**: e.g., is there a risk that we won't be able to get the training we need to successfully complete this task? (risk)
- **budget**: e.g., might we not have enough money to complete this task? (constraint)
- **time**: e.g., will there be sufficient time for us to complete this task or should we scale it back? (constraint)
- **resources**: e.g., does the school have the technical equipment we require in order to complete this task? (constraint)
- **external dependencies**: e.g., what do we do if one of our external experts, who travels a lot, is unavailable when we need her input? (risk)

As it reviews each task, ask the project team to flag any constraints or potential risks it needs to be mindful of. Remind the students that constraints are realities that necessarily limit or restrict a project, while risks are factors that may negatively impact a project's success. To help them discern between the two, provide the students with examples of each that relate to their project topic.

## > Conducting a SWOT Analysis

Professional project managers rely on a SWOT analysis in order to identify the strengths, weaknesses, opportunities, and threats related to a project (Bensoussan and Fleisher, 2012).

Strengths and weaknesses are internal to a project. To a large degree, they are controllable by the project team. In contrast, opportunities and threats are external factors that may positively or negatively impact a project. In themselves, they may not be controllable by the project team, but the project team can nevertheless try to mitigate them, avoiding as much as possible the threats to a project and leveraging the potential opportunities.

In conducting a SWOT analysis, ask a project team to brainstorm:

- the strengths of the project, such as its originality and/or potential to make a difference;
- the weaknesses of the project, such as its limited scope;
- any opportunities the project might be able to take advantage of, such as an upcoming competition to which a final deliverable could be entered;
- the threats to the project, including any risks the project might face.

The goal of a SWOT analysis is to maximize a project's strengths and opportunities, whilst minimizing its weaknesses and threats. A student team can optionally be required to include a SWOT analysis within its project proposal.

## Evaluating Risks and Constraints: Risk Assessment Review

Just being aware of the specific risks and constraints inherent to a project is not a sufficient plan for dealing with them. A project team needs to adhere to the limits and restrictions posed by constraints. So too, each risk must be evaluated in terms of how likely it is to occur and what level of planning is warranted. For each identified risk, encourage a project team

to ask itself which of the following four statements best applies:

A project team can instead plot what it believes is the likelihood of a risk occurring on a scale from 1 (very unlikely) to 5 (very likely). Although important, ensure that the project team doesn't get bogged down in this process, debating endlessly the likelihood of a risk occurring. Remind the students that as this is fundamentally a forecasting exercise there are no for certain right answers.

1. This risk is likely to occur. We must have a plan in place to deal with it.

2. This risk is unlikely to occur. However, if it does occur it will seriously impact our project. We must have a plan in place to deal with it.

3. This risk is likely to occur. However, its impact on the project will be minimal. We can address this risk if and when it occurs.

4. This risk is unlikely to occur. We can address this risk if and when it occurs.

Of the above four statements, some project teams may be tempted to propose the last two courses of action for risks that in fact warrant advance planning. In reviewing a student team's draft project proposal and task list, provide the team with specific feedback in this regard. Also don't hesitate to set the expectation that a student team resubmit its project proposal showing how it has planned in advance for each risk that warrants the team's attention.

## Managing Risks and Constraints: Mitigation Planning

In general, there is a relationship between how ambitious a project is and how many risks it faces. A project that faces many risks may be too ambitious and need to be scaled back in order to ensure its success. On the other hand, as noted at the beginning of this monograph, risk is inherent to learning. Depending on the context, a project that faces no risks at all may not be ambitious or challenging enough.

Just because a project has risks does not mean it will not be successful. Success is determined not by the existence of risks, but rather by how well those risks are planned for and managed by the project team.

Professional project managers distinguish between *risk appetite* and *risk tolerance*. The project management standards define risk appetite as "the degree of uncertainty an entity is willing to take on in anticipation of a reward" (PMI, 2013, p. 311). Countering this, risk tolerance is "the degree...of risk that an organization or individual will withstand" (p. 311).

In planning a project, a student team may mistakenly posit for itself a risk appetite level which is markedly higher than its risk tolerance level. For example, in its zeal to film a full length motion picture (rather than a smaller, more modest short film), a project team may be tempted to ignore or minimize risks associated with the amount of time and expertise that will realistically be required.

Successfully mitigating the risks to a project requires a student team, during the planning phase, to determine an appropriate risk response for each risk (Kerzner, 2013). This might include:

• **eliminating a risk or constraint by altering the project plan**: e.g., as the school does not have the equipment needed to complete a project, the student team secures the permission of a nearby school to borrow its equipment;

• **transferring a risk by moving it outside the project**: e.g., a teacher is concerned that a student team's project will not adequately address a key curriculum standard. Although she could require the team to alter its project plan, the teacher instead decides to cover the curriculum standard at a later point in the school year using a direct instructional approach;

- **minimizing a risk or constraint by altering the project plan**: e.g., a movie making project calls for an expensive high definition camera to be rented. A concern is raised that the camera may become damaged if it is not properly cared for. To minimize the risk, the project team designates a specific member of the team to be responsible for the camera at all times. The project team also budgets for the additional cost needed to rent a hard protective case for the camera;

- **accepting a risk because to alter the project plan would be worse than taking the chance the risk might occur**: e.g., because of her high level of expertise and in the absence of another available expert, a project team accepts an external expert's offer of help despite her limited availability.

The last risk response above is without a doubt the riskiest course of action to take, but there are nonetheless situations where a cost/benefit analysis by the project team and teacher warrants not altering the project plan despite the potential risk.

In such cases, it is especially critical that the risk be closely monitored. Indeed, fast action by the project team may be required if the risk becomes a reality. For example, in the above example, the external expert may announce half way through the project that she needs to suspend her participation in the project, following a final meeting with the project team, due to other pressing commitments. In this case, the project team likely needs to quickly prioritize a list of questions to ask the external expert during its final meeting with her.

# References

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# About the Author

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# Discussion Questions

1. Review the risk factors listed on pages 2-3. Brainstorm three additional risk factors that could impact a school project.
2. Reflect on a recent project you have led or contributed to. Were the risks and constraints adequately identified? Were they well managed and planned for?
3. Design an age appropriate organizer that the students you teach could use to identify and plan for the risks and constraints associated with a project.