Effective Project Management (PM) training is a delicate balance between the scholarship of academe and the scholarship of application. Reflective-heuristic practice, crisis management (CM), and the rigor of a Project Management Notebook (PMNB) can be combined with guided simulation to facilitate students becoming effective practitioners in the use of Project Management. The chapter briefly explores reflective practice, crisis management,
and the PMNB as tools for achieving that end. A ten-week simulation that has proven effective in teaching students how to project the application in problem solving efforts is described.

Introduction

Merriam and Caffarella (1999) have emphasized the role of experience in learning, especially when linked to reflective thought and action. Their views echo Mezirow (1991) in terms of thinking about what you are doing as you are doing it (e.g., being fully in the moment with congruent thought, action, and projecting forward the consequences of an action). Experience and public reflection make learning a socially interactive process (Jarvis, 2006). This emphasizes the power of collaborative learning through work teams (Davis, 2002) and how collaboration transforms the classroom into a practitioner learning community (Joyce, Weil, & Calhoun, 2004). The process works best when delivery mechanisms are compatible with desired learning outcomes (Mager, 1997).

Guided simulation can be an effective tool for creating a collaborative learning community manifesting purpose and responsibility, especially when it becomes a heuristic process that shapes meaning and gives perspective to solve problems abductively. While not all graduate education involves reflective heuristics, reflective heuristics, as manifested in critical pedagogy that utilize dialogic and dialectic methods, should be the cardinal objective of graduate training (Wink, 2011). While there are many approaches, there are no shortcuts.

Background

Reflective practice, as posed by Mezirow (1991) and Merriam and Caffarella (1999), creates intentionally acting practitioners who critically assess the premises underlying construction of the meaning of an experience and the meaning of that meaning. It is a hypothetical-deductive model stressing posing a problem based on presenting evidence and then developing and testing a hypothesis derived from critiquing the problem and the consequences of taking a specific action based on the content of the problem. It includes the process by which it is unfolding and the premises surrounding its diagnosis and the resolution of the course of action. Thus, heuristic reflection represents experimental-experiential problem solving through ongoing assessment of environmental feedback to improve performance by projecting forward the consequences of a chosen action.

Reflection projects forward the consequences of a proposed response and how that response should be adjusted as circumstances change. Applied to such disciplines as Project Management (PM), reflection rethinks how a project team coherently and intentionally applies protocols as it moves through the project's life cycle. Ideally this leads to double-loop learning wherein students traverse from neophytes to practitioners, with reflection the bridge between the two stages (Argyris, 1993).

Premise reflection promotes mindfulness in our actions and their results based on how a problem is posed. Mindfulness combines proposition analysis with creative insight to shape the meaning of an event and formulate a response to it (e.g., properly recognizing a crisis-inducing trigger and implementing an appropriate response). The challenge is that an action may be distorted by unwarranted presuppositions based on prior learning. Premise reflection re-assesses the adequacy of prior learning and opens it to contradiction. It involves a dialectic mindset that sometimes transforms our belief system.

A project team is a community held together by feelings of belonging, attachment, shared expectations of accountability, inclusion, availability to one another, and personal and professional respect. Project team reflection creates and nurtures an “emergent we” wherein experiences are enriched because they occur with, and are shared with, others based on nurturing relationships bonded by roles, accountability, and authority. The evolution of the emergent we project team is a decidedly reflective heuristic process, especially when confronted with difficult problems.
Heuristic Reflection

The process begins when a project team is assigned a problem that it is expected to resolve. Resolution requires forming integrated critical thinking-based judgments about the problem's content, the unfolding process within its context, and the premise(s) underlying its elemental components and environmental circumstance. The conclusions resulting from this process are translated into actions whose consequences are thought forward to assess resolution effectiveness and to prevent reoccurrence of the same or similar problems in the future.

Pedagogically, heuristic reflection creates deep learning of the subject matter (e.g., project risk management) and its relationship to what is already known so it may lead to intentional action that mitigates adverse events and prevents their recurrence.

Risk management is a Project Management Body of Knowledge (PMBOK) component that especially lends itself to heuristic reflection and taking intentional action. Understanding crisis management and recovery is critical to becoming an effective, reflective PM practitioner.

Crisis management may be framed as a six phase process (Brownlow, 2006). The dotted clockwise rotation encircling Phases I–III represents tightly coupled punctuated actions intended to mitigate adverse events (Spender & Grinyer, 1995; Spender & Grinyer, 1996). Phases IV through VI are composed of reflective-heuristic actions indicative of double-loop learning. The dashed rotation encircling Phases IV–VI represents loose coupling of adaptive change initiatives implemented over time (Hsieh, 1992; Spender & Grinyer, 1995; Spender & Grinyer, 1996). The counterclockwise rotation represents undoing the loss of collaborative relationships among and between project stakeholders that may have exacerbated Phases I through III. The critical component in successfully moving from Phases IV through VI is creating and nurturing a coalition of the willing (Kotter, 1995).

The area of intersection represents the potential for moving into the reconciliation and renewal process. Phases IV–VI emphasizes the differences between technical work and technical change and adaptive work and adaptive change as defined by Heifetz and Linsky (2002).

Phase I: Coming of the Forerunners:

Forerunners, sometimes called prodromals or triggers, are early warnings of project crisis. The typically complex, nonlinear dynamics of triggers can cloak detection (Barton, 2001). If stakeholders collaborate to identify and mitigate forerunners, they resolve project issues instead of suffering project crisis (Fink, 2002).

Phase II: Acuteness in the Now:

Phase II is the acute, rapid, chaotic expansion of events harming the project and fragmenting its network of collaborative relationships (Barton, 2001; Fink, 2002; Guinivan, 2004; Jederberg, 2005).

Phase III: Technical Resolution:

Technical resolution resolves pressing issues and returns to normal project operations while preparing to manage any immediate aftermath (e.g., recovering cost and schedule performance).

Phase IV: Post Mortem:

Post mortem is a rigorous assessment of what went well, what didn't, and why. It identifies weaknesses and/or threats that caused the crisis and how they may be mitigated to prevent recurrence, thus creating double-loop learning. An effective post mortem lays the foundation for moving forward.

Phase V: Reconciliation: Precursor to Renewal:

Reconciliation reassembles the fragmented stakeholder's collaborative network. There are five interdependent components. The first promotes dialogue to understand the meaning and
meta-meaning of events impacting the project’s performance and its stakeholder network. It involves asking and answering challenging, reflective questions to facilitate moving forward together (Baldwin, 2004; Boyes-Watson, 2005; Stone, Patton, & Heen, 1999).

Secondly, the nobility of each stakeholder’s work is affirmed by acknowledging potential career injuries associated with a specific project role (such as reporting “bad news” to powerful stakeholders or having been given “bad” data to work with).

Phase V’s third component is reestablishing any trust undone by the crisis. This is accomplished by recommitting to an inclusive project stakeholder community to prevent project silos and “hunkering down” (Feldman, 2004; Hurst, 2002; Putnam, 2000). Trust correlates with how stakeholders commit to their work and to each other through relational coordination (Gittell, 2003).

Reconciliation’s fourth element is rebuilding shared vision based on valuing the project’s outcomes. Shared vision is converted into results through engagement.

The final phase of reconciliation re-bonds the project’s charter to the stakeholders’ working-together network by nurturing extended community through proper conduct and relational coordination (Cohn & Friedman, 2002; Field, 2003; Gittell, 2001; Gittell, 2003; Hodson, 2001; Hodson, 2005; Reeves, 2004; Wheatley, 2003). The adverse rhetoric of crisis communication is replaced with reconciliation-promoting language. Wheatley (2003) and Palmer (2000) discuss faith in tomorrow, coming together, and the power of vocation to facilitate community and reconciliation.

**Phase VI: Renewal: Full Recovery:**

Renewal completes the process. Hurst (2002) defines renewal as that which replaces what was lost or forgotten. Achieving post-crisis project renewal requires adaptive strategies that balance changes in the project’s external environment with improved relational coordination in its internal environment.

The first strategy nurtures sustainable relationships that transcend the hunkering down that sometimes accompanies crisis. Relational coordination sustains relationships and enables moving forward (Akdere, 2005; Cullen, Johnson, & Sakano, 2000; Gittell, 2003; Hurst, 2002; Ulmer & Sellnow, 2002; Weymes, 2003). Darling and Russ (2000) argue that congruence of purpose (e.g., commitment to the project’s mission), shared values, collaboration, and responsive learning promote sustainable relationships.

The second renewal strategy links change initiatives to facilitate adaptive change in network relationships and work processes (Heifetz & Linsky, 2002; Hsieh, 1992). The third strategy reinforces adaptive changes necessary for double-loop learning. This places the work and responsibility of renewal where it belongs—on the project stakeholders.

The fourth strategy is to maintain engagement to enhance collaborative learning and ensure leadership accountability (Barr, Stimpert, & Huff, 1992; Darling & Russ, 2000; Gittell, 2003; Hodson, 2001; Lund, 2004). Collaboration relies on an integrated project social structure that harvests the power of functional diversity (e.g., how various functional roles within the project create the synergy of working together).

**The Project Management Notebook (PMNB)**

As a tool of good project management, a project’s history is maintained in an audit-ready project management notebook that represents the project’s infrastructure and contains all project decisions and criteria by which those decisions were made. The PMNB also shapes the project’s culture (i.e., the values and norms that govern behavior among and between project team members and the team’s social and relationship capital network) that, in turn, influence the willingness to collaborate, take prudent risks, deal with crisis, or engage in reflective practice. The project’s infrastructure and culture are also influenced by events arising from its immediate external environment and how those events are responded to (Schein, 2004).

A PMNB can take many forms and vary in complexity, contingent on the oversight philosophy of the organization approving and overseeing projects.
Description of Basic PMNB Elements

- **Project Mission**
  What the project will accomplish (the problem to be solved).

- **Scope**
  Project size and boundaries.

- **Project Execution Strategy**
  How the mission will be accomplished; the schedule mileposts that must be met to accomplish the mission by its completion date; how scope is divided into individual work packages.

- **Resource Requirements**
  Defines what is needed to achieve the mission and when and where it will be deployed. It includes costs, schedules, labor, and equipment.

- **Risk Planning**
  A SWOT: An audit of the strengths, weaknesses, opportunities, and threats the project may encounter within its operating environment. Strengths and weaknesses are internal to the project; opportunities and threats are external to the project. Once this is complete, a Risk Breakdown Structure (RBS) that includes the probability of the risk (i.e., W/T) occurring, its trigger event, the impact of its occurrence, and mitigation plan should the risk occur, along with the cost of the mitigation plan.

- **Formal Project Charter**
  Formally launches the project and is signed by the authorizing authority.

- **Management Oversight**
  Includes phased decision gates wherein movement to the next phase of the project is authorized. Oversight leads to project controls that track cost and schedule performance, scope creep, and role, authority and accountabilities (RAAs) tracking.

- **Communication Plan**
  The overall plan for communicating project status, who communicates it, when it is communicated, and how it is communicated.

An Example Simulation

Moving through a project’s life cycle, and responding to the vagaries in such movement, requires technical and adaptive work and technical and adaptive change as framed by Heifetz and Linsky (2002). It also requires ongoing reflective practice that fosters intentionality of action. To emphasize use of reflective heuristic practice and integrating its results into a PMNB, a simulated project, fraught with challenges, is deployed in a way that deliberately induces crisis. The simulation is as follows:

**Week One**

Students receive the following project information:

Exotic Motor Cars (EMC) designs, assembles, and markets exotic automobiles. EMC is known for rigorous quality, indefatigable reliability, hyper-responsive customer support, and brand exclusivity.

Workers are fiercely proud of their skills, products and relational coordination philosophy. Nowhere is this more evident than its fit-check facility in Central City, where motors are subjected to painstaking specification checks, test runs, dynamic-balance tuning, and other complex routines before being shipped to either North Prairie (forty miles north) where sedans, shooting brakes,
and SUVs are assembled or to Mountain View (fifty-eight miles south) where coupes and roadsters are assembled. Once at the appropriate site, motors are queued for installation in the appropriate vehicle. Motors and vehicles are highly customized, based on customer specifications and option selections, and must be an exact match in regard to engineering physics and performance specifications.

EMC technicians are the best in the industry and loyal to the EMC brand despite occasional acrimony with management. Central City technicians have developed long-standing personal friendships that include off-work family activities. There are active employee resource groups and a highly engaged diversity council. Central City has a fifty-year-history and many employees have over thirty years of service.

Using Lean+ and Six Sigma methods, employees reduced fit-run check cycle time from two weeks to eight hours. Management promised no layoffs as a direct result of Lean+ and Six Sigma. However, due to a downturn in the market for exotic automobiles and increasing costs, management has decided to close Central City and move the fit-run check process to car-side point of use. There will be a 35 percent reduction in the workforce and significant savings due to the high cost of maintaining the aging Central City site. Remaining employees will be reassigned to North Prairie or Mountain View based on the collective bargaining agreement. Due to a possible sale of the site, the project has a hard schedule constraint of ten months. The move will break up many long-standing friendships and force remaining employees to commute long distances over heavily congested freeways. The union has filed a claim of unfair labor practice. EMC has argued that the Management Rights article of the Bargaining Agreement allows plant closings and employee reassignments.

**Action:**

Students begin developing the project plan, in the form of a PMNB, for a shutdown and move from Central City. The plan should focus on SWOT, RBS, people and communication, but also have all other PMNB elements covered in the PMBOK. Weekly status reports are required.

Particular importance is placed on documenting the assumptions made in the construction of the plan based on work content and the process by which content will be accomplished. This includes the premises underlying why the project is being planned the way it is.

**Week Two**

Rapier Racing, EMC’s motor supplier, has quietly submitted a proposal to perform the fit-run-check function at its factory in Stuttgart, Germany, and then ship installation-ready motors directly to assembly line point of use in North Prairie and Mountain View. Due to the complexity of matching customized motors with uniquely optioned automobiles, Rapier estimates it will be twelve months before motors start arriving at North Prairie and Mountain View. If implemented the proposal would eliminate an additional 15 percent of the Central City workforce and save twenty-seven million dollars in direct labor cost.

**Action:**

Have students adjust the project plan to include Rapier’s proposal, paying particular attention to cost, scope, risk, schedule impact, and potential mitigation strategies. The project communication manager is reminded that an activity report is due no later than two days before the next class.

**Week Three**

Word leaks that Rapier Racing has proposed shipping installation-ready motors directly to assembly line point of use. The union’s Bargaining Unit alleges that outsourcing is another violation of the bargaining agreement, while management continues to argue that it retains such rights under the Management Rights article of the contract. Another ULP is filed.

Unbeknownst to management, Central City’s labor-friendly mayor, who is up for reelection and concerned about the loss of tax revenue associated with EMC’s move, uses back-channel means to inform the union that he will permit peaceful
demonstrations against the plant move. Several days later the union orchestrates mass demonstrations. One hour before and after each shift employees picket the plant’s main entrance and plan to do so indefinitely. Even though the pickets are informational, delivery drivers refuse to cross the picket line, thus disrupting motor delivery, which then disrupts the fit-run-check process, which then disrupts shipping motors to their destinations, which then slows assembly line production. For two minutes of every break period, workers chant, “You lie! You lie!” Employees start wearing tee shirts with the words “You lie!” stenciled on them and orchestrate rolling sickouts. EMC files an Unfair Labor Practice suit against the Bargaining Unit.

Customers begin complaining about delays in delivery of their expensive automobiles and threaten to cancel orders based on the negative press and perceived mistreatment of EMC workers. To worsen the community relations’ issues, the producers of a planned James Bond film refuse to place an exclusive EMC roadster in the film.

Both the union and management retain legal council to supplement their legal staff. Meanwhile, it is discovered that much of the sensitive computing and tooling equipment used in the fit-check process fell out of calibration certification when it was moved. All shipped equipment must be re-certified and three hundred sets have been moved to date. Due to the sophistication of the equipment and the calibration process, it will take thirty days per unit to recalibrate.

**Action:**

Have students assess the cost and schedule impact of calibration recertification. Students must also consider how Employee Relations, Organizational Effectiveness, Human Resources, and other stakeholders will mitigate growing anger and fear among employees.

Inform students that another project status report is due and it must include Cost Performance Index (CPI) and Schedule Performance Index (SPI), as well as mitigation costs.

Have students discuss the assumptions they made in developing and modifying the plan to date and how the content and process of their project work is changing and what, if anything, should be done to deal with the evolving circumstances.

**Week Four**

Senior management and other stakeholders pressure for immediate resolution. Local media publishes human interest stories detailing how EMC’s actions are displacing loyal, long-term employees, who will find it very difficult to find new jobs in the depressed labor market. Local, labor-friendly politicians hold public meetings. A prominent United States senator calls for investigative hearings on the relationship between EMC and Rapier Racing. Communication is politicized as the union and EMC battle for credibility. EMC leaders worsen matters by inadvertently giving contradictory direction.

The Bargaining Unit presents a plan for saving EMC more money than the shutdown and outsourcing will save. Management argues that the plan’s statistics are distorted to gain public sympathy.

Due to the Bargaining Agreement, workers know who will be laid off and when. Long-standing friendships unravel. Fights break out.

In an unrelated event, an EMC transporter carrying forty motors and forty sets of diagnostic equipment to North Prairie is involved in a catastrophic three-fatality accident that erupts in flames. All motors and equipment are lost. There is now a shortage of installation-ready motors because EMC carries very little safety stock due to its “just-in-time” inventory philosophy.

**Action:**

Have students adjust all aspects of their project plan impacted by this latest round of events. This should include, but not be limited to, communication strategy (including media relations), RBS, litigation, transportation, schedule, parts shortages, and government relations. If students have not identified these factors in their RBS, they are instructed to do so. CPI and SPI are again reported, as are all mitigating actions to date and an assessment of their effectiveness. Have students prepare for a press conference to mitigate the collateral damage from adverse public relations fallout.

Students are again taken through a reflective practice exercise to identify what assumptions they have been making and how those assumptions were incorporated into adjustments to the project plan. This will also include ongoing assessment of lessons learned that are documented in the PMNB.
Week Five

Work to rule, rolling sickouts, and other concerted strategies have nearly halted work at Central City. Employees who can retire (and many can, due to their high years of service), retire, thus creating a critical skill shortage.

The press conference becomes a public relations disaster when a project spokesman provides inaccurate information which is immediately challenged by the media and union leaders. Things are made worse when an EMC executive speaks to the importance of being sensitive to all stakeholders’ needs, especially those owning stock in the company. The story makes national news when the union president makes incendiary comments that further inflame the rank and file.

Action:

Students must again adjust all aspects of their project plan impacted by events to date. They must also prepare a communication plan for informing the workforce that EMC will outsource the fit-check process and how any negative impact will be mitigated. The union stages a public rally against EMC. EMC files another Unfair Labor Charges suit against the union.

Week Six

An explosion rocks Central City site and the subsequent fire destroys a major work-staging area. Sabotage is alleged, but an investigation is inconclusive, suggesting that a faulty transformer may have caused the blast. The fire’s rapid spread is attributed to toxic chemicals that may have been improperly stored or used as an accelerant. All work at Central City site is terminated. The union denies any involvement and calls off all corporate campaign activity, since closing the site is now moot.

Federal agencies become involved in investigating the explosion and fire. There are rumors of calling a grand jury who will subpoena the PMNB. The Environmental Protection Agency is granted a court-ordered cleanup of Central City site once EMC vacates. The potential buyer withdraws its offer due to all the bad press and acrimony surrounding the planned move. To repair its public image, EMC offers to gift the site, bordered by a river, for a park to Central City and take a tax write-off.

Action:

Students close out the project, using proper PM protocols, and prepare an ISO-style audit. Although every component in the PMBOK will be covered, risk management, people strategy, and communication planning will be subjected to intense scrutiny by multiple investigative groups. A cost assessment for mitigation efforts is also requested.

Week Seven

Management requests a comprehensive “lessons learned” report for the entire project, plus assurance that the PMNB will be “bulletproof.”

Action:

Based on reflective heuristic practices, students prepare a thorough assessment of the project. Special emphasis is placed on how presenting issues were discerned and evaluated based on presupposition. A key question to be addressed is what should have remained within the scope of the project and what should have been commissioned as a separate project. Also subject to inquiry will be why decisions were made the way they were and by what criteria they were made.

Week Eight

The EMC Board of Directors directs the project team to develop a plan to heal damaged stakeholder relationships (e.g., the union, employees, Central City leadership). The plan will either be an addendum to the original project plan or be commissioned as a separate project. The plan will be assessed based on hard measures that include relational coordination effectiveness. The plan must include all Phase V elements and be developed using reflective heuristic processes.

Action:

Have students develop a reconciliation plan to heal the relationship with Central City employees, the Bargaining Unit, the local community, and other stakeholders. The plan should include all project elements and be approached as an addendum to the original plan and then assessed in terms of an amended RBS. The plan should include all the elements of Phase V crisis management elements and use ongoing lessons learned as the basis for continued reflective process.
Week Nine
The EMC Board of Directors directs the project team to develop a renewal plan to increase EMC’s organizational effectiveness and restore its lost vitality. The plan will include all project elements and be approached as an addendum to the original plan or commissioned as a continuation of Phase V CM. The plan must include all Phase VI elements.

Action:
Have students present their plan for Phase VI, being sure that they utilize reflective heuristic process.

Week Ten
A debrief of the exercise is held that includes how the project navigated through its life cycle and how it managed crisis, especially forerunner detection and the use of reflective-heuristic processes to create intentionality in action.

Clearly this is a complex project that includes multiple and powerful stakeholders, cost and schedule issues, risks, communication, and scope creep. Crucial questions abound. Does the Rapier proposal fall within the original project boundaries, or is it a case of scope creep? How do the accident and the loss of motors and equipment fit into the project, if at all? Would working closely with the Bargaining Unit, using trust and relational coordination, have prevented or minimized the union’s adverse reaction? How does a project manager and her team resist political pressure to technically resolve the problem rather than taking adaptive, double-loop actions that prevent reoccurrence?

Other reflective questions surround development of the SWOT and RBS—how much should have been foreseen? What forerunners should have been heeded? What thought processes influenced decisions and were the consequences of decisions thought forward?

Future Research Directions
This integrative approach offers numerous opportunities for future research. For example, what systemic factors in the project’s infrastructure, as defined by the PMNB, influence the SWOT and RBS process and how can aspiring PMs best be taught these factors? How do content, process, and premise reflection influence development and nurturance of extended stakeholder networks that manifest relational coordination, and how can students best be taught these processes?

Another area worthy of exploration is how premise and content reflection influence forerunner detection, and how simulation exercises can facilitate such detection. A further area for research is exploring how PMNB construction promotes relational coordination, especially in times of crisis, and how findings can create new models of PM reflective heuristic practice for both students and practitioners. Still further, how can reflective-heuristic practice be applied to recovering and renewing stakeholder relationships that have been harmed by project crisis, and how can students best be taught to do that in a real way.

Finally, it is worthwhile to explore how this pedagogic strategy can be applied to developing organizational and educational leaders (Brownlow, 2006) and training of HR practitioners, especially in the fields of labor and employee relations.

Conclusions
Integrating reflective-heuristic practice, Crisis Management, and the PMNB with simulation as a primary learning tool promotes exploration of the content, process, and premises underlying how projects are managed. Students learn to find their way by applying reflective-heuristic practice to achieve a project’s mission and document the rationale for decisions and subsequent action.

Having students develop reconciliation and renewal plans emphasizes the importance of maintaining relational coordination throughout the project’s life cycle, especially if the project derails.

All of this is predicated on the seminal importance of “forward thinking” the results of decisions and actions. It is also predicated on the belief that the essence of PM work is people and results (Gray & Larson, 2008). These should be cardinal lessons learned, not only in the classroom but in practitioner life as well.
References


