

## **Graduate Risk Management Research and Education Program in Botswana**

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### **Abstract**

Many graduate programs in risk management are embellishments of undergraduate risk management education, with the discussion of more potential solutions, more technical details and additional assignments analyzing the status of risk management. The authors propose that the paradigm for risk management education should be first to improve the existing risk management process model, and second, the theoretical dismantling of existing paradigms and discussion, through the use of theory validation by testing, measurement and the use of case studies, thus minimizing personal experience and bias. Graduate education should sharpen the graduate students' personal risk management capability by enhancing their individual perceptions and by practicing risk management, learning that risk management is a technique that applies to all types of projects regardless of technical area. A current research test is ongoing to transition from an education based risk management class to a research based class at the University of Botswana. The authors document the existing syllabus and requirements, and the new syllabus, the changes, and the methodology of the new class.

### **Keywords**

Graduate research, Industry interface, Implementation of research

### **1. Introduction**

The University of Botswana has recently commissioned a Masters of Project Management (MPM) program in the Civil Engineering department of the College of Engineering and Applied Sciences. The MPM program is not solely concentrated on managing construction projects, but the management of all types of projects in different industries and disciplines. The curriculum of the MPM program includes courses in:

1. Project Assessment, Monitoring, and Evaluation
2. Project Quality Control and Safety
3. Risk Management
4. Procurement

Project management is a relatively new concentration at universities. It is usually treated more as a practice or profession which is filled by engineers, consultants, or personnel who are promoted to manage projects due to technical expertise. The MPM program faced the following challenges:

1. To make the program a graduate level program, and not a certification or extension of undergraduate education.
2. To upgrade the program to address project management in all industries, and not just construction management.
3. To teach the latest techniques in project management.
4. To get the expertise of highly qualified professors in project management into the program to develop the courses.

Since its inception, the MPM program coordinator has brought professors with expertise in to analyze the MPM program. In 2006, program coordinator Joe Ssegawa, searched for a professor from the United States who had the following resume:

1. Experience in teaching project management in multiple areas including construction.
2. Had research experience in running projects.
3. Experience in building graduate programs.

In 2007, Ssegawa was successful in submitting the paperwork through the University of Botswana system, and to the Fulbright program, and in 2008, through the sponsorship of the US State Department Fulbright program (Makowiecki, 2008) brought Dean Kashiwagi, the Director of the Performance Based Studies Research Group (PBSRG) from Arizona State University (ASU) to the University of Botswana as a Fulbright Scholar (FS) to:

1. Analyze, and propose improvements to the MPM program.
2. Teach two classes: the Project Assessment, Monitoring, and Evaluation and the Quality Control and Safety courses.
3. Propose how to form an industry interface between the UB MPM program and the Botswana industry to do PM research.
4. Mentor lecturers to raise their level of expertise and teaching/mentoring skills. This activity would take precedence over the others, since the FS was only at the UB for four months over the course of a school year.

This paper proposes that the paradigm for risk management education should be first to improve the existing risk management process model, and second, the theoretical dismantling of existing paradigms and discussion. Through the use of theory validation by testing, measurement and the use of case studies, thus minimizing personal experience and bias. Graduate education should sharpen the graduate's student personal risk management capability by enhancing their individual perceptions and practicing risk management, learning that risk management is a technique that applies to all types of projects regardless of technical area. This paper also presents a current research test for the transition from an education based risk management class to a research based class at the University of Botswana. The authors document the existing syllabus and requirements, and the new syllabus, the changes, and the methodology of the new class.

## **2. Graduate Level Education**

There are two major organizations in the world teaching project management, the Project Management Institute (PMI) and the International Project Management Association (IPMA). Both organizations have a certification program to certify project managers. Many organizations that use project managers require

the certification; the most famous of which is the PMI PMP (Project Management Professional). The requirements of the PMP include coverage of many of the same fields as the MPM program.

The first objective of the Fulbright Scholar (FS) was to assist in the transformation of the MPM program from an education/certification orientation to a research based graduate program. However, due to the daunting nature of the task, the FS quickly changed the objective to identify a course in the MPM program which could be used as a test case for the transformation. If the transformation was successful, other courses could be transformed and eventually the MPM program could be transformed from an education based to a research based program.

There are two major challenges in teaching project management (PM) and risk management (RM) on the graduate level. First, graduate education is meant to improve not only the PM/RM capabilities of the project manager, but should also improve the existing PM/RM model itself. This differentiates a graduate or postgraduate course from certification/undergraduate education. Certification programs such as PMP test an individual against an existing requirement. Whether the requirement is optimal or valid is not questioned. It is based on best practice.

The second major challenge of a graduate program RM/PM course is to be able to theoretically define the RM/PM functions in the overall project management environment, to ensure that the functions and interfaces are based on logical constructs, and to be able to analyze and improve the functions. The authors propose that this is graduate level course work.

### **3. Challenges to Transformation**

Immediately, the following became evident:

1. The FS came from a totally different approach to graduate education. He was business minded, research based, taught based on research test results and not published textbooks (17 years, built a \$7M research program with no university funding, created a graduate level program, performed over 500 research tests, had over 100 publications in his core expertise of PM/RM/best value, and could teach without teaching materials). UB lecturers were not in this mode.
2. He was comfortable with change, with testing new concepts immediately, with challenging students to question all existing practices. He had been developing successful cutting edge project management and risk management models based on theoretical concepts and deductive logic which were contrary to many current project management practices, and was very comfortable with continuing tests to validate the models. He proposed to start testing in Botswana immediately.
3. He came with his own time table and objectives, which were beyond the expectations of the MPM coordinator and faculty.
4. He viewed his time not only as a visiting Fulbright professor, but as valuable time to increase the project management and risk management body of knowledge, and to be able to help transform the MPM risk management classes from education based to research based.
5. His production level as a professor is unmatched in terms of publication, research grants, research tests, impact to the industry, business modeling of a graduate program, and mentoring.
6. He was very confident, had very little fear of failure, and was confident he could overcome some of the existing cultural resistance to change by running prototype tests.

After continuing discussion with the program coordinator, and experience in teaching the first course Assessment, Monitoring, and Evaluation course, the following became evident:

1. The existing classes were textbook based, traditional education classes.
2. The existing curriculum was put together based on traditional PMI and IPMA topics. The existing program had many of the buzzwords of project management, but was short on actual mechanisms that could be used and case studies of actual applications.
3. The objective of the courses was to pass the traditional knowledge to the students, exam them on the knowledge, and pass them if they were able to express the body of knowledge that they had learned.
4. The format of the program included course requirements, a syllabus, exams, and assignments.
5. The grading or marking scheme was 60/40 on exams and coursework, and the required passing grade was 55%.
6. The course instructor was the critical component in the class, usually using textbook material to educate the students.

The transition to a research based course had to overcome the following challenges:

1. Find an instructor in the PM section who would have the interest, capability, and time to change paradigms.
2. The instructor's paradigm had to change from education to research based.
3. The instructor had to be introduced to deductive logic, hypothesis testing, and research tests.
4. Research tests had to be initiated with the industry and connected to the class.
5. The education runs counter to existing logic and what was taught in other classes. The course material had to be coordinated with the other instructors.
6. The student culture and expectation in the MPM was education based and not research based.
7. The time allowed for the transition would be two months, spaced over a four month period.

#### **4. Hypothesis**

The hypothesis of this test is to be able to identify an instructor and MPM class to use as a test case to study if the MPM program can transition from an educational based class to a research based class. The authors proposed to use the best value PIPS/IMT concepts to first find an instructor with a MPM course. The best value aligned instructor would then be mentored, design a research program with the class, and create a research platform to support the class, the research effort, and publications and proliferation of the results.

#### **5. Methodology**

The methodology is divided into two phases:

1. First, to identify a faculty member and a course to test the hypothesis.
2. Second, to work with the faculty to transform the syllabus, to create an accompanying research and publication program, and a platform to support the program.

To achieve the hypothesis, the FS created the following program to work with the PM section to do the following:

1. Spend time working with the project management section, the Head of the Civil Engineering Department, and the Dean of the College of Engineering.
2. Introduce them to the paradigm of change, alignment, deductive logic, industry structure, research tests and results, strategic planning with courses and research, and the building of a powerful research unit.

3. Identify who had the most interest, time, and understanding in the new paradigm, fit the philosophy of releasing control, transparency, and win-win, was comfortable with change, and had the tenacity to overcome resistance.
4. Align the course, the course instructor, and the research test, and the new paradigm.
5. Coauthor publications with the best value, most aligned instructor.
6. Create research test opportunities, teaching opportunities, and time with the Fulbright scholar.
7. Create a scheme where the instructor would substitute for the Fulbright scholar.
8. Request the instructor to mentor another instructor.
9. Request the instructor to build a strategic research plan parallel to the risk management class.
10. Create a graphic showing how the risk management curriculum integrated into the other courses and the objectives of the entire program.

The requirement on the instructor would include:

1. Theoretical approach instead of practice.
2. Increased publications.
3. Analysis based on documented results instead of “best practice”.
4. Perception that current models led to current conditions, change is the only option for solution.
5. Run research tests.
6. Treat students as partners and valuable resources.

The measurement of success of the hypothesis and methodology would be:

1. Did the course instructor rework the syllabus to make it research based?
2. Is the course theory based?
3. Did the course instructor run tests?
4. Did the instructor increase publications?
5. Did the instructor pass an exam of the mentor on the risk management technology?
6. Could the instructor look at things from 30,000 feet, explain the MPM program integration, develop an accompanying research program, with a platform that assisted in the course, research effort, and program?

## **6. Selection of Instructor and Course**

The FS used the first two months to align the test. The FS did the following:

1. Recommended that all PM section faculty including the Dean of the College and the Head of Department, and the MPM program coordinator attend every presentation, research test activity, and class where the Fulbright was involved.
2. Gave five presentations to the section and civil engineering department.
3. Spent time creating a strategic plan for the transition, asking everyone for their feedback and their own strategic plan that tied into the overall proposal.
4. Emailed participants continually, watching response content and response times from the faculty.
5. Taught the Assessment, Monitoring, and Evaluation class. FS used the class to assess the students, the level of theoretical thinking and discussion, and potential for research.
6. Repeated attempts to have group meetings to establish a strategic plan and synergy to align the coursework, research, and publications.
7. Ensured the staff that PBSRG would cover the shortfall of any requirements.
8. Identified who would assist in research presentations.
9. Identified who would go on the research tests.
10. Identified who would follow up in the FS’s absence.

11. Identified who would assist in writing papers.
12. Identified who understood that the FS was trying to build the capability of PM section faculty, giving of all FS's resources, and appreciate the time donated to building a research program.

Although everyone showed extreme interest at first, the normal duties of each PM staff member made it extremely difficult for the PM staff to become integrated into a new paradigm. From 15 years of experience, the FS knew that in order to align with the new paradigm, the best value instructor for the new PIPS paradigm would have to have the following characteristics:

1. Respect for the FS's time. The Fulbright, his work, his body of knowledge, and his achievements identified him as a "walking expert." Not only did he have a vision, he could implement tests easily and immediately. Over the last 15 years, experts in the PIPS/IMT expertise have spent much time with the FS. This is the first time in the 15 years of the FS's life, that he has committed four months to a specific academic unit or research client. Respect for the FS's time, using the FS's time wisely, taking every opportunity to see how the FS educated both students and research clients, reading his manual, and assisting him in his teaching, coordination, and research duties would identify the best value instructor.
2. Spend time being educated by the FS in his class.
3. Spend time teaching the FS's material.
4. Be enthusiastic.
5. Applying the concepts of the new technology to traditional concepts.
6. Applying the new technology to not only research and teaching, but also strategic planning to proliferate the technology.
7. Alignment with the FS's perceptions, teaching methods, and technology.
8. Participating in the FS's research.
9. Interested in strategically planning how to sustain the new technology.
10. Writing papers with the FS.

The major task was to find the instructor who would be the most conducive to teaching the new technology. There was not sufficient time to convert someone to the new technology. The technology was dominant:

1. Created over \$7M of research funding.
2. Over 500 tests.
3. 98% performance, change order rate less than 1%, minimized risk management activity up to 90%, increased vendor profit by 5% without increase in cost.
4. Tested in the delivery of other services at Arizona State University creating \$50M of investment by the vendors.

The FS used the best value PIPS technology to identify the most aligned staff. The results were dominant. One of the lecturers quickly volunteered to:

1. Attend every class the Fulbright taught.
2. Teach the FS's classes while he was gone to the US.
3. Review the course materials and administer the tests.
4. Drive the FS to every industry presentation possible.
5. Took over the research tests once the tests were setup while the Fulbright was away.
6. Organized the other PM section instructors to keep them informed of the progress.
7. Kept in constant contact with the Fulbright.
8. Took the mentoring role with some of the younger instructors in coordinating and teaching PIPS/IMT concepts.
9. Very conducive to the IMT concepts of deductive logic, win-win, transparency, alignment, no control, value, and everything being at equilibrium.

10. Took exams, answered student questions, and taught research clients with very little preparation.

Another faculty member also showed great interest, and supported the effort. The difference was the age, experience, and business acumen. The FS therefore selected the first faculty, Pasis Mselle as the primary instructor, and her course Risk Management as the test course, and the secondary instructor Mex Muatjetjeja in the supporting role. The FS was already assigned to teach the Quality/Safety class and is using the class to mentor the younger, supporting faculty. The FS would at the same time participate with the other remaining PM section faculty as much as possible.

The FS discussed with the instructor and the following philosophical changes were made to the Risk Management course:

1. The risk management class should be research based.
2. The risk model should be analyzed by the students for performance, risk, logic, and improvement.
3. Ongoing research tests and results should be incorporated into the class.
4. The syllabus should be flexible depending on the feedback and progress of the class.
5. The students should be treated as a resource instead of traditional students. Every student should add value to the class in some way.
6. Every student should bring a presentation into their organization as a class assignment.
7. The emphasis should be placed more on student contribution instead of student feedback. The success of the class should be performance based in terms of research papers, new concepts, impact to the industry, and changes in student behavior.
8. The course should meet the requirements of the class, but recommendations should be given at the end of the semester to change the requirements and syllabus based on research results.

This transition has never been done by the FS outside of PBSRG at ASU. The UB PM staff was education oriented, had little research background, and had very few publications in the last few years. The workload in the PM section was very heavy, with lecturers teaching up to three classes a semester, two undergraduate and one graduate class. There was no administrative support for the lecturers. There was no research funding assistance, no structured program to assist the lecturers, and lecturers did not have a lot of industry experience in their graduate program course areas. The hypothesis that a very successful professor and research program can come to a struggling program in an underdeveloped industry, culture, and university and partner to bring dominant change is very much at risk.

Mselle was then also requested to coordinate the strategic plan to make the PIPS/IMT technology sustainable at UB and create a platform which would support her in the absence of department and college assistance. She would also heavily involve and mentor the younger lecturer, Mex Muatjetjeja. The other PM staff also showed great interest (MPM coordinator Joe Ssegawa, Procurement expert Aderemi Adeyemi, and another staff member Wilson who specialized in sustainable construction).

## **7. Research Based Risk Management Course**

Mselle performed the following in conjunction with the FS:

1. Became knowledgeable in the risk management structure of PIPS, and the deductive logic of IMT.
2. Used the Construction Industry Structure (CIS) to define different levels of risk, different delivery systems, responses and risk management techniques for risk.
3. Created a new risk management model which identified the client's PM as the source of risk instead of the contractor, and identified the solution to minimize the risk (Mselle, 2009) and the 2009 Risk Management manual (Kashiwagi, 2009).
4. Changed the syllabus from an education based class to a research based class.

5. Using two major research clients, the US Embassy and the Bank of Botswana to test the new risk management model, and integrate the research results into the course curriculum.
6. Used the PIPS weekly risk report to monitor the student's progress in the class.
7. Created an integration plan between the new RM course and the MPM curriculum.

The objective of the Risk Management course is to bring the student into the risk environment, and create a new proactive approach to risk minimization. The new risk model identifies the source of risk as the inaccurate perception of initial conditions, leading to a false expectation. As the project proceeds, and the client sees the actual conditions of the project different than their initial expectations, that difference is defined as risk by the new risk model. This simple change of perception and paradigm has unique ramifications and affects every participant in the delivery of services. This new perception identifies the current risk management procedures as reactive, instead of proactive, and the source being the client's decision maker instead of the best value vendor who can more accurately describe the initial conditions.

The emphasis of the graduate class will be to make the students understand that risk management is an individual perception and practice, a technique that is applicable to all practices, processes, operations, and activities. The theoretical discussion of the Information Measurement Theory (IMT) differentiates the Risk Management course from undergraduate education or certification classes. IMT allows the theoretical dismantling of existing paradigms, and a discussion of deductive logic and basic theory that is dominant or simple, and introduces a method of validating theory through cause and effect and simple measurement. It also forces the student through their own individual experience with a new risk model, and allows the use of the personal case study to validate the theory. Students will learn two major objectives: first, an accurate but general definition of risk, and how risk is minimized, and second, the ability to practice the risk management to validate one's perception. There should be no one right answer, but the answers should be validated through hypothesis testing and critical analysis.

The new syllabus will include the following modules:

1. Industry Structure. Structure to understand different environments of risk. First, where risk is passed from one entity to another, and minimized using contracts, insurance, bonding, and management and control, and second, where risk is minimized due to accurate assessment of initial conditions, proper alignment of resources, and the minimization of risk by experts.
2. Reactive Risk Management System.
3. Proactive Risk Management System.
4. New Risk Management model.
5. Performance Information Procurement System: documented and clear methodology to assess, monitor, and evaluate project performance and deviation.
6. Application of PIPS in Botswana environment.
7. Identification of other risk management models and classification by documented performance, alignment with efficient and effective practices, and ease of implementation.
8. Application of weekly risk report to identify performance of the student in the Risk Management class.
9. Two midterm exams.
10. Presentation of individual risk management analysis.
11. Final exam.

The course assignments of class will be:

1. Participate and document in a research test case using the new risk management model.
2. Identify another risk management model/system and compare it against the new Risk Management Model and the PIPS risk management system.



3. Identify seven different risks in current affairs, and identify how the risk could have or should have been minimized using the new Risk Management model and the PIPS concepts. Document the sources.
4. Weekly assignments will be the readings of IMT, PIPS, other risk models, and current affairs.
5. Students will also be required to track their class progress with a weekly risk report.

## **8. Conclusion and Recommendations**

A research test is being conducted at the University of Botswana MPM graduate program to change a traditional risk management course to a research based risk management course. The change of paradigm is being facilitated by a Fulbright Scholar (FS) from Arizona State University. The centerpiece of the transformation is a new project management/risk management technology, the Performance Information Procurement System (PIPS) and an underlying deductive logic, the Information Measurement Theory (IMT). Another centerpiece is the new Risk Management model which identifies the client/buyer and the client's delivery system as the major source of risk. The FS is using the PIPS/IMT technology to create the transformation:

1. Use the IMT and PIPS alignment concept to prequalify the instructor and course using alignment of instructor's affinity to characteristics of PIPS/IMT concepts, the ability to transform the graduate course, and have an accompanying strategic research plan and platform.
2. Creation of a new risk management model.
3. Integration of ongoing research projects with the course curriculum.
4. Creating an environment that the students are continually using the risk management concepts and tools in the course.

The measurement of success of the hypothesis to create the transition in four months is going well. Despite political issues, coordination issues, and availability, the transition to a research based class is going well. Of the seven measurements of success of the hypothesis testing, six of the seven are well under way:

1. Did the course instructor rework the syllabus to make it research based?
2. Did the instructor define why the course is research based?
3. Did the course instructor perform research and incorporate the results into the course?
4. Did the instructor publish papers on the transition, and on the research results?
5. Did the instructor pass an exam of the mentor on the risk management technology?
6. Was a before and after syllabus identified, with the justification for the change?
7. Did the instructor identify how the new course is integrated into the program, and what impact it creates on other courses?

A follow-up paper will be written once the semester is concluded with the results. It is recommended that this same approach be taken by the other MPM courses to integrate research into the MPM. If successful, the approach can be taken repeatedly by the MPM program.

## **9. References**

- Makowiecki, Kelly, Program Officer, Sub-Saharan Africa, Fulbright. (2008). Email from Fulbright program titled "Fulbright", dated 3/26/2008.
- Mselle, Pasis. (2009). "New Risk Model," Chapter 8, in New Risk Management/Project Management Model, PBSRG, Arizona State University, Tempe, AZ, 85287.
- Kashiwagi, Dean. (2009). "New Risk Management/ Project Management Model, PBSRG", Arizona State University, Tempe, AZ, 85287.