Provost's Learning Innovations Grant for Faculty
Request for Full Proposal
2008-2009

Project Title: Enhancing Student Success In The Data Analysis Sequence Using Learner Centered Pedagogy And Best Practices Incorporating Instructional Technologies.

Applicant(s):

<table>
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<tr>
<th>Name</th>
<th>Bernadette Lanciaux, Ph.D., M.Ed.</th>
<th>Telephone</th>
<th>5-5835</th>
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<tbody>
<tr>
<td>Dept.</td>
<td>School of Mathematical Sciences</td>
<td>College</td>
<td>Science</td>
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<tr>
<td>Name</td>
<td>Yolande Tra, Ph.D.</td>
<td>Telephone</td>
<td>5-4497</td>
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<tr>
<td>Dept.</td>
<td>School of Mathematical Sciences</td>
<td>College</td>
<td>Science</td>
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**Request for Full Proposal Requirements**

1. **Title of proposed project:**
   Enhancing Student Success In The Data Analysis Sequence Using Learner Centered Pedagogy And Best Practices Incorporating Instructional Technologies.

2. **Summary of proposed project:**
   Our Pilot involves re-designing Data I (1016-319) including
   - Resequencing the order of topics to mirror the actual data analysis process used in the profession.
   - Devising a new set of PowerPoint slides
     - reflecting the new topic order
     - incorporating active learning prompts and
     - weaving effective on-going assessment throughout the course using the JoinIn on TurningPoint “clicker system.
   - Gathering and including examples and real data sets from the departments from which our student come for a greater connection between 319 and the student's major.
   - Using the features of myCourses more fully in the teaching of the course sequence.
   - Creating a model course in myCourses for 319 that reflects the new topic order, and parallels the website created by Professors Crystal and Mathiason for Data Analysis II (1016-320). This model course will include course calendar with the new feature of Prep Days and imbedded active links to guide students in preparing for class and following up after class.
   - Creating and maintaining a Learning Object Repository in myCourses including materials from all faculty who teach 319, and recommendations for common materials for all sections of the sequence of courses.

3. **Targeted learners or population (include departments, year level, number of learners impacted).**
   The students targeted are enrolled in 1016-319 and are required to take the data analysis sequence for their majors in packaging science, business, hospitality, psychology, physician’s assistant, information technology, networking, new media and graphic arts, etc. The majority of students in 319 are sophomores, with the rest being rather evenly split between freshmen, and juniors, with a few seniors.
   Each section of 319 has approximately 30-35 students. These sections were offered during 2007-2008.

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<tr>
<th></th>
<th>20071</th>
<th>20072</th>
<th>20073</th>
<th>20074</th>
<th>total</th>
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<tr>
<td>319 (sections)</td>
<td>14 (x 35)</td>
<td>12 (x 35)</td>
<td>12 (x 35)</td>
<td>2 (x 35)</td>
<td>40 (x 35)</td>
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<tr>
<td></td>
<td>490</td>
<td>420</td>
<td>420</td>
<td>70</td>
<td>1400</td>
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4. **Is this for a current course or new course?**
   This is for adapting an existing course.

5. **Anticipated impact on teaching and/or learning.**
   We expect
   a. Students to be more engaged with the subject matter of the course. This will be achieved by explicit incorporation of active learning strategies in lectures, use of data about the students themselves and data from their home departments.
b. Improved student performance. This will be achieved by more time on task, more explicit instruction on how to prepare for class, and more immediate feedback through the various low-stakes assessments that are auto-graded and can be taken multiple times.

c. Greater coherence across the data analysis sequence (319/320). This will be achieved by leading the students through 319 in a manner that mimic’s how practitioners actually analyze data. Students in 319 will carry out a complete statistical analysis repeatedly, preparing them for 320.

d. Greater consistency between multiple sections of 319. This will be achieved by sharing the model course and accompanying outreach to other instructors (in particular new faculty) on using the model.

e. Greater "buy-in" to the common core structure by faculty. This will be achieved by adding the entire Statistics faculty as "guests" to the pilot courses. We will also give a presentation to the Statistics faculty of the School of Mathematical Sciences on the results of the project. We will ask for feedback on the individual course components via the tool in myCourses in addition to a survey of faculty who teach the course sequence.

5. How will your project impact student success (i.e., retention)?

We expect that more students will be successful. The calendar with prep days and active links is more consistent with the learning style of millenial (today’s point and click learners). With the self-graded HW and quizzes, students will have immediate feedback on how they are doing. They will be able to identify what they are having difficulty with so they will be able to get extra help. Faculty will also be able to see what topics students are struggling with (via item analysis) and adjust instruction accordingly. Self graded items will also give faculty more information about individual students to allow for intervention by the faculty and early alerts. Active learning strategies incorporated into daily slides and integrated with the clicker system will help the students be more engaged in class in addition to the benefits of on-going assessment for adjusting instruction according to student needs.

6. How you will measure the impact, how you will report your findings, and what you will share about your project in a faculty forum?

a. Students more engaged with the subject matter will be evaluated by students' responses to a mid-term and an end of quarter evaluations of the technology and methods and whether they felt the use of instructional technologies enhanced their classroom experience.

b. Improved student performance will be evaluated by examining the results of the common core portion of the final exam. The department has been administering this exam for several years so we can compare the performance of students in the pilot study to other students taking 319 that quarter and to the historical data.

c. Greater coherence across the data analysis sequence (319/320) will be evaluated by tracking student performance in 320 looking for differences between students who had been enrolled in the sections of 319 using the piloted method and students enrolled in other sections.

d. Greater consistency between multiple sections of 319 will be evaluated by comparison of course materials used in different sections of the courses.
Present a rationale for your project, as it ties to the intent of the grant, including:

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<th>a. why it is not part of regular college business:</th>
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<td>We are developing materials for 319, looking at the course sequence 319/320 as a whole unit. We are reaching out to other departments to make the course more relevant to the students who are required to take the class. We are also consulting with other departmental faculty who teach the course so that we can integrate ideas from many experienced teachers into the model course learning object repository. There is not enough time for this degree of coordination between faculty during the regular course of college business.</td>
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<th>b. describe how your project is relevant to other faculty and what you think it would take to transfer your success to other faculty:</th>
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<td>New instructors are hired to teach sections of 319 all the time. If we present new faculty with a model appropriate for RIT (10 week teaching quarter), it will be easier for them to use this structure rather than to &quot;re-invent the wheel.&quot; Current faculty members are more likely to use this structure because they will be consulted in its construction and because the materials will be made readily available to them through myCourses and they won't have to upload or type them themselves to use them.</td>
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<th>c. relevant credentials, experience of involved faculty/staff:</th>
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<td>Bernadette Lanciaux has been teaching statistics since 1984. Recently (2004) she earned her Masters of Education. She also has been involved in the NY State Secondary Math Curriculum so she has first hand experience about where the students in 319 are coming from. In addition, at RIT, she has participated in many on-line learning, and teaching and learning center workshops. Yolande Tra was on the teaching faculty for four years at the University of Michigan teaching introductory statistic courses. At RIT, she taught 319 for four quarters and 320 for six quarters. She is currently the coordinator of 320 sections.</td>
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<th>d. describe how this is innovation in your discipline or program:</th>
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<td>The traditional lecture approach to data analysis uses a statistical theory based topic order. What we propose is novel in it that mimics what a statistician does. (Uses KUDOS: Know, Understand, Able to Do approach). The specific innovations are</td>
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**Teaching:**

Creating Innovative Course Materials and Creating New Kinds Of Learning Experiences that are more student centered including

- Creating a survey tool to generate a data set for analysis that is about the current learners.
- Add Minitab lab project with instructions that guides students to apply the techniques taught in class to real world examples (including the student data set and data from departments we service).

Integrating research based instructional methods and making the courses more learner-centered. Methods including

- Creating tools to help learn who our students are.
- Active Learning: For 319, this will involve incorporating the JoinIn on TurningPoint "clicker system questions, into the daily slide shows so that their use is woven throughout the course.
- Learning how to integrate the publisher supplied supplementary teaching materials designed to be integrated with on-campus classroom management software.
- Differentiated Instruction: The Blended Learning structure gives us a way to use differentiated instruction in 319, which we believe will meet the needs of diverse learners better than a one-size-fits-all approach. Scaffolding will be provided for all learners, some learners may choose not to use it. Rather than reduced "seat time," students who enjoy collaborative learning and/or need more guidance will stay in class with the teacher to complete the worksheets and students who are more independent learners can do the worksheets on their own. This leaves a smaller number of students in class so that the teacher can provide more one-on-one instruction to the students who genuinely need it while not irritating the more independent learners.
Learning:
Developing Student Study Resources including
- Prep Day: Presenting the course schedule for each course in a calendar format with instructions for Prep Day in addition to Class Days. The calendar will have active links to daily lesson materials (slides etc.) and student study resources. These will include the readings, slides for the lecture, low stakes assessment that the students had to take before class on vocabulary and content to guide their reading and help them be prepared when they come to class.
- Blended Learning: The course will take advantage of the blended format. There will be an enhanced role for group work, on-line discussion, pre-class quizzes, in addition to on-line access to lesson materials, student study resources, low stakes assessment with immediate feedback and, copies of worksheets to be used in class.

Provide a timetable of the development of the project.

<table>
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<th>Dates</th>
<th>Goals</th>
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<tr>
<td>Spring 0708</td>
<td>Meet with departmental faculty to discuss 319 and 320, solicit input and collect copies of potential course materials. Arrange meetings with other departments’ representatives to discuss their needs from 319/320.</td>
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| Summer 0708 | 1. Meet with representatives of other departments about applications of data analysis in their disciplines.  
2. Examine past student performance data.  
3. Learn to more fully use the functionality of myCourses with the aid of the staff at OnLine Learning.  
4. Learn to use the publisher provided supplemental materials in a way that fits our student body, including instructions for our faculty on how to set up WebAssign for their classes here at RIT.  
5. Learn to use JoinIn on TurningPoint "clicker system and incorporate them into lesson plans.  
6. Revise the order of topics for 319, develop examples, exercises and project based on knowledge of who our targeted learners are, create more learner centered teaching materials and incorporate them into lesson/study plan interactive website. for 319. |
| Fall 08     | 1. Implement the new course structure in our sections of 319 and 320.  
2. On-going meeting/discussion on how the pilot is going.  
3. Give a presentation to the Statistics faculty of the School of Mathematical Sciences on the results of the project and ask for feedback.  
4. Revise based on experience and feedback. |
| Winter 0809 | 1. Give a presentation to the Full faculty of the School of Mathematical Sciences on the results of the project.  
2. Promoting the site based approach to all adjuncts and new faculty teaching 319 and 320. |
| Spring 0809 | Present results to the Seaway Section of the Mathematical Association of America at the spring sectional meeting. |