Report: Improving Student Learning Grant – Semester 1, 2011

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**Position:** Assistant Professor, School of Agricultural & Resource Economics

**Project Title:** Bringing Real World Decision Support into Management Decision Tools

**Unit:** SCIE3367, *Decision Support Tools for Natural Resource Management*

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**Project description:**

SCIE3367 is a 3rd year unit that attracts approximately 50 students/year. The unit has traditionally focussed on mathematical programming and computer modelling.

It is not always clear to students why they need to learn these modelling skills, and why modelling is relevant for decision support. This gap reduces the level of student engagement in lectures and tutorials.

The project objectives were to develop simple models to be used as demonstrations, based on ‘real-life’ decision support tools (DSTs) used by natural resource managers.

**Project implementation and outcomes:**

In 2011, this unit was jointly taught by three different people, which required a compromise about the tutorial models to be developed.

We used the software ‘Mathematica’ to visualise the abstract economic concepts taught in this unit. A postgraduate student was employed to develop online demonstration projects in Mathematica. These demonstration projects were subsequently used in the computer labs, to help students understand some of the mathematical optimisation concepts. The projects are available online via [http://demonstrations.wolfram.com/OilMalleeFarmingOptimizationProblem/](http://demonstrations.wolfram.com/OilMalleeFarmingOptimizationProblem/) and [http://demonstrations.wolfram.com/FarmerJimsDecisionProblemGrowingWheatOrBarley/](http://demonstrations.wolfram.com/FarmerJimsDecisionProblemGrowingWheatOrBarley/).

The Mathematica demonstrations were only partly successful. Although they helped students to conceptualise mathematical programming, there was still little relevance to ‘on the ground’ DSTs. The ISL grant was used for further improvements in 2012 (fully co-ordinated by myself).

Based on a survey of decision makers in WA, I chose four computer models that are actively employed in ‘the real world’. Natural resource managers from the WA Departments of Fisheries and Agriculture, as well as scientists from the CSIRO, will aid in the 2012 unit delivery. Three guest lecturers will discuss how they use IMAGINE, Yield Prophet, and the WA Rock Lobster models to help guide decisions. A fourth, agricultural, DST (MIDAS) will be discussed during the lectures. A simplified version of each computer model has been developed with aid of a postgraduate student. These models are discussed in the computer labs and used as part of the unit assessment.
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The real world DSTs illustrates the value of mathematical programming in guiding environmental management decisions. Additionally, the participation of guest lecturers demonstrates future career relevance to students.

The simplified tools developed in 2012, will provide an excellent foundation for further unit improvements. Student surveys and feedbacks will be sought upon completion of the semester. I anticipate presenting the results of this work at a seminar during the 2013 Teaching and Learning month.

I am very grateful for the support that the Centre of Advanced Teaching and Learning (CATL) has provided for this project. The two postgraduate students involved in this project have gained valuable computing skills. The project has also greatly contributed to my development as a researcher, and an effective teacher. I am hoping to continue to build on the learned skills, and to further enhance students’ learning in the future.

Budget acquittal statement:

A total of $3,000 was received from CATL. These funds were supplemented by the School of Agricultural & Resource Economics. A detailed breakdown of expenses is attached to this report.

Marit Kragt
19th July 2012