

A MULTI-MEDIA EDUCATIONAL PROGRAM IN PASTURE ASSESSMENT AND MANAGEMENT

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Summary. An interactive, multi-media learning and assessment program in pasture management is being developed, comprising a series of case studies with supporting information sections. The software was written using *Macromedia Director*. Each case study contains background information, a question, a list of alternative answers, feedback, and links to other sections of the case study based on user response. Resources such as graphics and video are integrated from external files as needed. Users are given case studies to conduct in the field and in the *Pasture Management* program. The latter extends the scope and depth of experience gained in the former, allowing users to study the consequences of their management decisions.

INTRODUCTION

This project is designed particularly for use by undergraduate students of Pasture Agronomy at the degree and diploma levels, but is of similar value for TAFE courses, farmers and agribusiness short courses, or directed self-learning.

The package, known as *Pasture Management* is an interactive, multi-media learning and assessment program. It has its origin in simple field exercises aimed at a central goal for students of pasture agronomy - the ability to integrate information from lectures, practical classes and field observations to determine appropriate management for pasture paddocks. Until now, the success of these exercises has been seriously limited because time available in the course allows students to view only a fraction of the range of pasture situations which reflect changes in climatic conditions and management activities through the year. Furthermore, there is almost no opportunity for students to interact with paddock situations (e.g. by testing alternative options) because management is determined by the manager or researcher in charge. There is therefore a need for assistance from computer technology to provide students with a wider range of field-related learning experiences and exercises, including the opportunity to interact with the program in simulation exercises, and in the exploration of alternative management options.

The aims of the project are to

- create a concrete application and thus incentive for the learning taking place in the course
- encourage students to integrate the various aspects of the course
- improve the ability of students to assess field situations and make management decisions
- provide a problem-solving approach
- contribute to the creation of professionalism in the education of farmers
- improve motivation by making learning more interesting
- encourage a holistic attitude by linking management decisions to overall goals and the conservation of the resource base

- allow students to participate at times that suit them

MATERIALS AND METHODS

The following types of information and opportunities for student learning are included in this package:

- Illustrated lectures and other information on pasture agronomy in the form of major principles, examples and applications, and research results.
- Illustrated case studies on management of pastures used for sheep, dairy cows, beef cattle, deer and pasture seed production.
- A reference, diagnostic, and identification section containing illustrations and descriptions of pasture plants, weeds of pastures, insect pests and pest damage in pastures, nutrient deficiencies of pasture species and the effects on pastures of unfavourable weather and poor management.
- A bibliographic section of a relatively small number of references.
- Glossary of technical terms.

The structure of the *Pasture Management* software is based on that of the *Medici* software developed by Mr Peter Devitt, Department of Surgery, The University of Adelaide. *Medici* comprises a set of interactive patient case studies for medical students. *Medici* has proved popular with students and is a fine example of a problem-based learning approach. An important feature is the ability of the software to allow non-programmers to add additional case studies.

However, *Medici* was only available for Macintosh, and the *Pasture Management* software was to be delivered on the *Windows* PC, and only possibly on the Macintosh, platforms. It was considered important to provide a rich graphical and video environment containing cross-referencing with lecture notes, a glossary, and other sources of information, and *Medici* was not designed to do this. Therefore, the decision to write custom software for the project was made.

The software was written using *Macromedia Director 4.04* for Windows. *Director* was chosen because of its:

- support for both Macintosh and PC platforms,
- provision of a scripting language (LINGO) for programming,
- ability to handle text, graphics, animation, video and sound in an integrated manner,
- ability to distribute the finished product as a stand-alone application, and
- popularity among Multimedia developers.

Like *Medici*, the *Pasture Management* software is essentially a programme that processes information contained in specially marked up text files. Resources such as graphics and video are integrated from external files as needed. Within case studies each decision point is represented by a text file. Each file contains background information, a question, a list of alternative answers, feedback and links to other text files based on user responses. As each question is answered the program moves from one external text file to another.

The marked-up text files contain a variation on the *HyperText Markup Language* (HTML) of the *World Wide Web*. This enables links to be embedded in the text that call up graphics, video, and other documents when a particular section of text is selected. This feature is used extensively in the Lecture

note section. It was considered important for non-programmers to be able to construct case studies and add to the lecture notes without programming support. A dedicated editor has been written to support authors in this way.

The graphical content of the *Pasture Management* software is provided by a very large colour slide database. These slides have been scanned and stored digitally. Video has been digitised and saved as quicktime movies. The software calls up these resources from external files as needed. Thus non-programmers may also add to these resources. This is achieved by placing resource files in predetermined directories and making links to these resources within case studies.

The software will be delivered on compact disk for delivery by a fileserver to a teaching network of 486DX PC's. Monitors have a resolution of 800x600x256 colours. The possibility of an Internet (*World Wide Web*) version exists with further development.

RESULTS

In this first year of development of the program, two types of activities have been conducted with undergraduate students.

1) Assessment of the condition of pasture paddocks, and the management required to achieve optimum pasture establishment and production. The students give ratings for such attributes of the pasture as plant size and vigour, weed infestation, insect pest damage and grazing intensity. These features in conjunction with climatic factors, soil characteristics and aims for paddock utilisation are the basis for a brief report proposing a management plan.

2) Students work with the presently available case studies in *Pasture Management*, moving through the following steps:

(a) An introductory section containing the necessary information as text, photographs etc, to assess the field situation and define management aims.

(b) A question asking the user what management steps should be taken.

(c) A series of optional answers to the question, from which the user chooses the best one(s).

(d) A score which depends on the correctness of the choice and explanatory feedback information.

(e) If a poor choice is made, the user may be given an opportunity to choose again.

(f) In many instances, the user is directed to continue along the same pathway (whether good or bad) to learn the later consequences of this action. They are then given another series of optional courses of action to choose from, each with scores and feedback. In such a series of choices, the user aims to maintain favourable outcomes following an initial wise choice, or to make amends for an earlier poor choice.

At the end of the case study, a short report is requested, to summarise the knowledge, concepts and principles the user has acquired.

At this stage in the development of the program, it is being assessed by means of student questionnaires and comparisons of their ability to deal with management problems before and after use of the program. At this early stage it is heartening to find that students at both diploma and degree levels have found the case exercises useful and have responded very positively to the programme. Assessment will continue in 1996.

DISCUSSION

This relatively new technology has great potential for education, provided educators make good use of its multimedia and interactive capabilities

Even at this early stage, it is clear that *Pasture Management* gives students a wider range of opportunities than previously available, to grow in their understanding of pasture management and ability to apply principles. The feedback sections provide not only information but also a means for the tutor to stimulate thought and discussion. Discussion groups can be organised to meet after submission of reports. Of course it also provides learning opportunities outside formal class times. This flexibility and the number of potential users will be increased by presenting *Pasture Management* on the Internet.

It is hoped that case studies presented in an imaginative, realistic and forceful way will imprint themselves on students' minds. Case studies also give opportunities for conveying the importance of such features of management as timeliness, forward planning, flexibility and the value of conserving the resource base. The program should also result in students being better equipped to solve problems and make management decisions through their ability to integrate a wide spectrum of knowledge, and to identify principles and apply them to new situations.

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