

**BUREAU OF SUGAR EXPERIMENT STATIONS  
QUEENSLAND, AUSTRALIA**

**FINAL REPORT - SRDC PROJECT BS194S  
REDUCING THE RISK OF EXOTIC PESTS  
AND DISEASES OF SUGARCANE**

**by**

**A V Vandermaat**

**SD99012**

**Principal Investigator:**

**Mrs A V Vandermaat  
Desktop Publishing Operator  
BSES  
PO Box 86  
INDOOROOPILLY Qld 4068**

**Phone: (07) 3331 3340**

*This project was funded by the Sugar Research and Development Corporation  
during the 1997/1998, 1998/1999 financial years.*

# CONTENTS

Page  
No.

## SUMMARY

<b>1.0</b>	<b>BACKGROUND .....</b>	<b>1</b>
<b>2.0</b>	<b>OBJECTIVES.....</b>	<b>1</b>
<b>3.0</b>	<b>METHODOLOGY .....</b>	<b>2</b>
	<b>3.1 Definition and analysis phase.....</b>	<b>2</b>
	<b>3.2 Design .....</b>	<b>2</b>
	<b>3.3 Usability testing.....</b>	<b>2</b>
<b>4.0</b>	<b>PROJECT TECHNOLOGY .....</b>	<b>4</b>
<b>5.0</b>	<b>EVALUATION.....</b>	<b>4</b>
<b>6.0</b>	<b>DISTRIBUTION .....</b>	<b>4</b>
<b>7.0</b>	<b>RECOMMENDATIONS .....</b>	<b>4</b>
<b>8.0</b>	<b>ACKNOWLEDGMENTS.....</b>	<b>5</b>

## SUMMARY

'Reducing the Risk of Exotic Pests and Diseases in Cane' was a project aimed at maximising the effectiveness of the Australian sugarcane industry's quarantine system.

The main objective of the project was to complete an educational CD-ROM package and to determine if the technology offered an additional opportunity for training and information transfer. The *Cane Guard* package was produced to provide the user with the flexibility to learn at their leisure and the ability to revise a topic as many times as necessary. Users can also review what they have learnt by doing a quiz.

The *Cane Guard* multimedia CD-ROM contains information about five diseases and two pests which could devastate the Australian sugar industry if they are not controlled. They are: chilo borer, sesamia borer, leaf scorch, Ramu scorch, Ramu stunt, downy mildew, Fiji disease and sugarcane smut.

The CD-ROM contains information about each pest and disease in the form of text, graphics and photographic images. The information is organised into the following categories: symptoms, control, entry, distribution, transmission, economic importance, hosts and description. The information is organised such that main points are displayed first, and users can link to further detail if they wish. Users explore the content by selecting the pest or disease and category using a simple menu interface. Users can also print a fact sheet summary for each pest and disease.

It is envisaged that the technology used for *Cane Guard* will eventually replace the traditional lecture-style or printed formats currently being used throughout the Australian sugarcane industry.

## 1.0 BACKGROUND

Costs associated with a pest or disease incursion can be considerable. The recent outbreak of sugarcane smut in the Ord River Irrigation Area could have had a devastating impact on the whole of the Australian sugar industry had it not been contained adequately. The pests and diseases included in *Cane Guard* are of major importance in Papua New Guinea (PNG) and Indonesian industries and could devastate the Australian industry if introduced here.

Pests and diseases featured on *Cane Guard*:

**Chilo borer** — would be capable of having a big impact on our cane crops. This pest has been found in the Torres Strait and there is concern it could have moved south from there.

**Sesamia borer** — is of significant economic importance wherever it occurs. Losses of up to 20% in production have occurred due to crop death and loss of sugar in affected stalks.

**Leaf scorch and Ramu scorch** — losses from leaf scorch have been restricted to highly susceptible varieties. Ramu scorch has caused only minor losses.

**Ramu stunt** — an outbreak of Ramu stunt in the mid 1980s in Papua New Guinea caused severe financial hardship on the commercial estate. The disease is potentially of high economic importance.

**Downy mildew** — Downy mildew has caused serious economic losses in Australia, Fiji, the Philippines, Taiwan, and Papua New Guinea.

**Fiji disease** — individual crop losses may reach 100% in susceptible varieties.

**Sugarcane smut** — yield losses may reach 100% if diseased crops are not destroyed early in the crop cycle.

## 2.0 OBJECTIVES

- Develop an interactive and upgradeable training package on the identification and control of exotic pests and diseases for the Australian sugarcane industry and AQIS.
- Reduce the risk of exotic pests and diseases introduced to the Australian cane industry.
- Distribute to and promote the training package among AQIS, Cane Protection and Productivity Boards and BSES staff.
- Provide users of the training medium the option to complete a self-test in the identification of exotic pests and diseases.
- Provide a benchmark for assessment of the value of interactives in training industry representatives and use this in the development of further interactive productions.
- Improve the standard of knowledge on exotic cane pests and diseases and the potential threat they pose to the Australian sugar industry.

### **3.0 METHODOLOGY**

The methodology is based on an international standard for structured software development.

The methodology divides the development process into a series of phases, each of which is critical in ensuring the quality and effectiveness of the package.

#### **3.1 Definition and analysis phase**

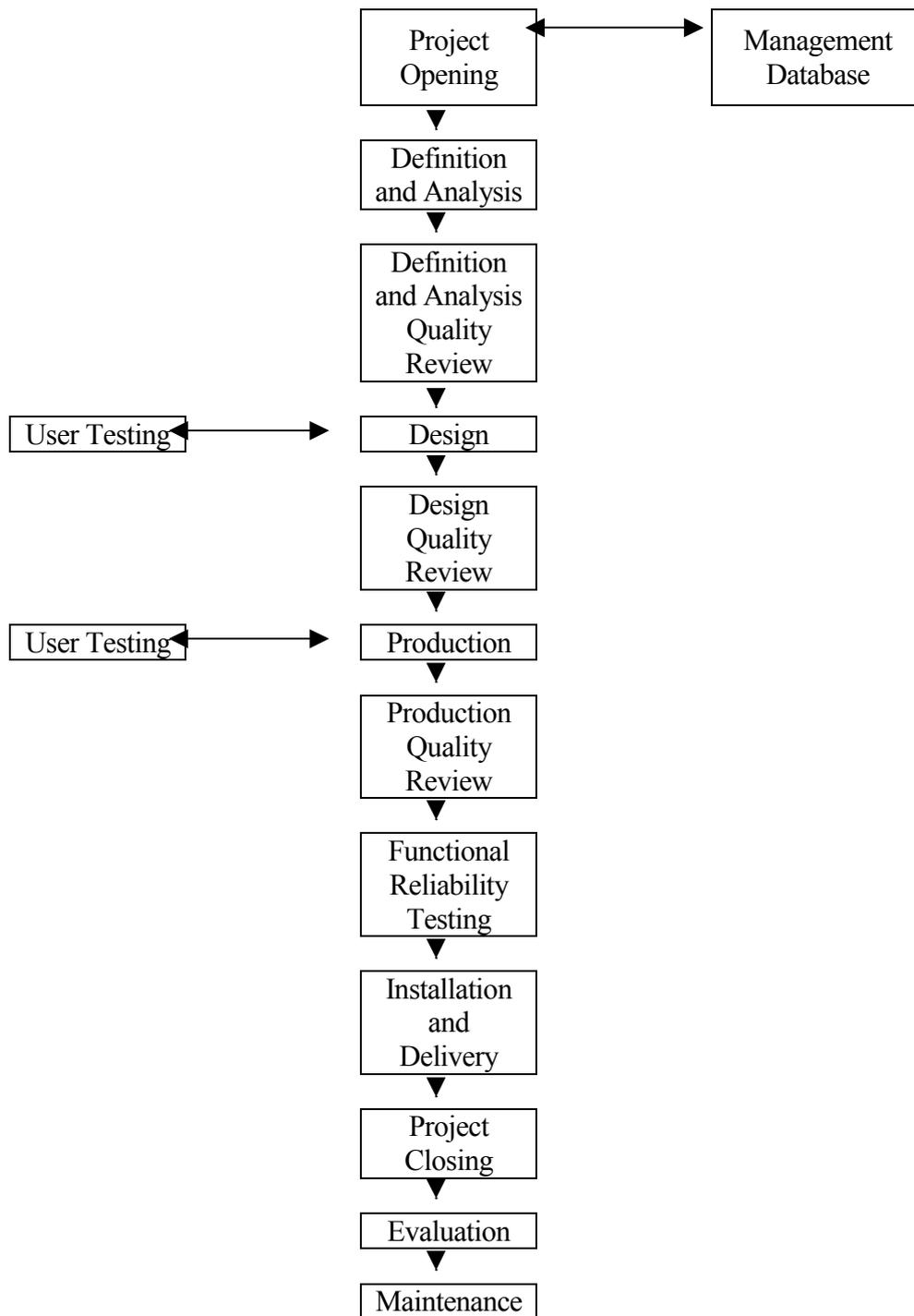
The purpose of this phase was to define the project and define the project requirements in a 'Requirements Document'. This document specifies the aims and objectives of the software project, and is used as input to the design phase. The document also summarises aspects of the project such as project management, marketing, development platform, delivery platform, research/content, materials, structure of the content and delivery.

#### **3.2 Design**

A 'Detailed Specifications' document was prepared as a paper-based representation of the interface, functionality, and structure of the package. Content for one of the topics, sugarcane smut, was entered according to these guidelines and a prototype developed.

#### **3.3 Usability testing**

During usability testing, representative users were invited to use the prototype and give feedback on the design and content. There were two usability testing sessions for *Cane Guard*, one for the prototype, another using content for all remaining pests and diseases. Staff from BSES, Cane Protection and Productivity Boards (CPPBs) and Australian Quarantine Inspection Service (AQIS) attended the usability sessions. Again, suggested changes to the content and interface design were implemented (see a summary of the suggested changes from the usability sessions in Attachment 1). The package was then circulated to BSES group managers, extension staff, research staff, CPPB staff and the project investigators for final comment.

**Figure 1. Courseware Development Process**

*(Source: Client Pack, QUT, Computer Based Education)*

#### **4.0 PROJECT TECHNOLOGY**

The technology used for this project is called interactive technology. Interactivity refers to what the user does to complete the learning experience. Research shows that consistent involvement requiring ACTION, decision making, reflection, and application of knowledge leads to improved outcomes.

#### **5.0 EVALUATION**

The purpose of the evaluation is to assess the extent to which the package (interface, layout, organisation of content) assists users to achieve the desired learning outcomes.

The most widely-used evaluation methods include:

surveys;  
questionnaires;  
interviews; and  
focus groups.

We will use telephone interviews and surveys to evaluate *Cane Guard*. This will be completed after *Cane Guard* has been distributed and users have had an opportunity to use the product.

#### **6.0 DISTRIBUTION**

*Cane Guard* will be distributed to staff at the following organisations:

- BSES
- Sugar Research and Development Corporation
- Australian Quarantine Inspection Service
- Quarantine personnel in Indonesia and Papua New Guinea
- Cane Protection and Productivity Boards
- Agriculture Western Australia
- Ramu Sugar Ltd
- Schools
- Libraries.

#### **7.0 RECOMMENDATIONS**

One of the most successful aspects of interactive technology is the creative organisation of text and visual data in ways that make the presentation of information more interesting. This format allows the user to learn at their own pace. This technology should be considered as a new way of learning and for producing educational material for the sugar industry.

The use of laptops, home computers and the Internet is dramatically increasing therefore it is important that these forms of learning tools are available. The sugar industry needs to stay at

the forefront of technology by encouraging the use of packages such as *Cane Guard* and educating its personnel in the identification of these possible threats to the industry.

## **8.0 ACKNOWLEDGMENTS**

The funding support from the Sugar Research and Development Corporation is gratefully acknowledged together with the contributions from many BSES media, pathology, entomology, extension and research staff, with particular thanks to Dr Robert Magarey. Specialist project management, design and programming skills from staff at QUT is also acknowledged and a special thanks to the staff from BSES, CPPB and AQIS who participated in the usability testing.