

Computer-Assisted Learning

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This seminar was presented in two parts: the first was an introduction to interface design, using the macro capabilities of Microsoft Excel; the second was an examination of the components of the Computer-Assisted Retail Decision Support (CARDS) program for evaluating beef and pork purchase decisions.

Designing a User Interface with Microsoft Excel

In many software packages, users can design interfaces (dialog boxes) to automate many tasks and make them faster and less error-prone. At Texas A&M, we've used Excel dialogs and macros in several areas:

Livestock judging contests:

- Contestant registration
- Automatic scoring and sorting of results
- Publishing contestant lists

Experimental data entry, validation and analysis:

- Beef, pork and lamb experimental cutting tests
- Validation of beef cattle simulation model
- Validation of neural network for commodity forecasting

This seminar explored the techniques needed to incorporate data entry macros into spreadsheets. We used Excel as our spreadsheet, but the same principles apply to Quattro for Windows, 1-2-3 for Windows, and even to DOS-based spreadsheets.

The method consisted of eight steps:

Step 0. Write Out Complete Specifications

This step is perhaps the most important in the entire process of creating dialogs. Often, there is a tendency to minimize this step, in the belief that the time is wasted. Nothing could be further from the truth! Once the goal of the dialog is completely specified, the implementation is usually straightforward. Include the purpose of the dialog and each of its elements (buttons, lists, edit boxes, etc.), and how and when the dialog will be used.

Step 1. Decide How Dialog Should Look on Paper

Draw out a sample dialog on paper. Assign a position for all data to be entered in a logical form: clickable radio buttons for small numbers of choices, edit boxes for numeric data,

and pull-down list boxes for selecting from numerous possible entries. You probably would also include buttons (e.g. OK and Cancel buttons).

Step 2. Design Dialog in Microsoft Dialog Editor

Microsoft's Dialog Editor application allows the user to create a dialog for Excel simply by selecting the desired interface element (button, list box, edit box, or text, for example) and placing it on the screen where desired. You may also label and resize the element if necessary. Dialogs should be clear, concise and easy to use, so resist the temptation to put too many words or objects in one dialog. If you require extensive user input, sometimes it's better to use more than one dialog, or combine dialogs with menus and/or buttons, keeping each one simple.

Step 3. Choose *Select All* from the *Edit* menu, then *Edit Copy*

Step 4. Go to an open macro sheet in Excel, then *Edit Paste*

Pasting the dialog into a macro sheet will cause a dialog box *specification*, that is, a table of numbers and words, to appear in the spreadsheet. This is the code for the dialog that you designed in Step 2. The dialog is executed (or run) with the command `=DIALOG.BOX(range)`, where *range* is the range of cells that contain the dialog box specification. It's a good idea to define a name for the dialog box range (as a rule of thumb, define ranges often; it makes it much easier to refer to a range of cell by *what they do* rather than by their *position* on the spreadsheet). If the name `DialogRange` is assigned to the specification, then the command `=DIALOG.BOX(DialogRange)` will execute the dialog box. To complete the macro, we defined the text for our list boxes and filled in a couple of macro instructions around the `DIALOG.BOX` command. We completed the job by defining the macro's name to Excel.

Step 5. Complete Remainder of Macro Sheet Instructions

Upon successful completion of the rudimentary dialog, we filled in a sequence of macro commands to control the dialog, validate data and data into a worksheet. The documentation that comes with Excel describes the complete syntax of the following commands, so we briefly discussed the purpose of parts of the macro, or sequence of commands.

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Step 6. Create Activator (Button or Menu) on Main Excel Worksheet

To provide for automatic execution, we placed a button on a worksheet that triggered the macro. The button can be sized, named and placed according to the user's needs, anywhere on a spreadsheet.

Step 7. Test

Finally, we tested the button to be sure it correctly triggered the macro to run, and that the macro runs successfully. Since the macro was designed for data entry, we entered some values and explored the error-checking that was built into the dialog.

CARDS: A Decision Support Tool for the Meat Retailer

In recent years, consumers of beef have progressively demanded leaner, more closely trimmed beef from retailers. Though there are numerous ramifications to this consumer behavior, the most immediate effects are on beef retailers and their decisions concerning retail pricing, subprimal purchasing alternatives and in-store cutting and trimming strategies. Beef today is leaner in the retail case than ever before, but much of this improvement is due to closer trimming specifications by retailers rather than greatly reduced fat on carcasses or boxed beef subprimals. Boxed beef subprimals, in many instances, still have up to one inch of external fat still attached. Thus, if subprimals have one inch of fat and retail cuts are sold with trim levels close to 1/8 inch, large quantities of fat must be trimmed and discarded at the retail level. For beef to remain competitive with the other meat groups, more efficiency in fat removal is required.

Prior to 1990, the availability of closer trimmed subprimals — 1/2- or 1/4-inch average — had been limited. Because the yields of closer trimmed subprimals from the carcass are lower than commodity subprimals, packers must demand a higher price per pound. Retailers had asked a key question: How much higher? The common thought had been that it may be more economical to buy the commodity subprimals and to trim them once to their specifications rather than pay for the difference in reduced yield and increased labor that a packer has to pay to provide closer trimmed subprimals that meet the retailer's specifications without further retrimming. Compounding the problem was the question of labor savings to the retailer by purchasing closer trimmed subprimals rather than having to do trimming at the retail endpoint.

In 1990, the National Live Stock and Meat Board (NLSMB) and the Beef Industry Council commissioned a study by Texas A&M and Michigan State Universities with a goal to communicate the new realities of cutability to retailers. Though most retailers recognize the importance of cutability in their beef program, the emphasis on closely-trimmed retail cuts adds a new dimension to the equation: What is the value of trimmed fat, and the labor required to cut and trim subprimals to retail? To address that question, researchers built a full model of a

typical meat department back room, under the supervision of the NLSMB and industry observers. Instructors from a school that trains meat cutters were hired to work the back room along with a trained wrapper. Over 100 cattle representing a range of carcass weights, quality and yield grades were fabricated into nearly 20 different subprimal cuts and shipped to Texas A&M to be fabricated into retail cuts. Times and weights were recorded on nearly all aspects of the operation.

At the outset, consideration was given to the form that results should take, to enable the widest possible utilization by the industry. Three major industry segments were identified, each of which has its own level of sophistication.

Large national and regional supermarkets. Many larger supermarkets already use computer programs to evaluate purchasing, cutting/trimming and retail pricing decisions. For these retailers, time and motion results might be of primary interest since most already implement cutting tests to measure cutability.

Moderate-size regional and multiple-store local markets. This audience also can make use of time and motion information, and many may also use the cutability data to estimate preliminary yields or the effects of closely trimming retail cuts. A system was planned to give these stores a tool for evaluating their decisions, modifying default settings as necessary to reflect their own information.

Smaller local markets with few stores. Many of these stores may not currently be computerized, or may require tools to use existing computer technology more effectively. Some may have limited information from cutting tests and little or no timing information. For these retailers, the system should allow the examination of relationships that they may not have considered adequately in the past.

This study involved collection of tremendous quantities of time and motion and cutting yield data. Contained within the CARDS software are yield tables and cutting time information that can be used to make decisions regarding purchasing boxed beef of various quality grades, yield grades and trim specifications. CARDS has been developed to assist retailers in analyzing purchasing and merchandising choices, allowing retailers to compare and contrast different boxed beef purchase options and to make educated buying decisions for their meat operations.

CARDS is Windows-based software that uses many aspects of user-friendly design (dialogs, menus, interactive tables and buttons) to encapsulate a great deal of information in a form that most users find more useful than research reports and complex tables. In this session, we simulated several cutting tests for beef within the CARDS program, and evaluated alternatives. Dollars profit and percent margin were automatically computed for each alternative, and labor costs were factored in, so that any decision could be an economic, rather than subjective, one.

Near the end of the session, we introduced Pork CARDS, which is targeted to economic optimization of pork retailers' merchandising decisions. Pork CARDS has a design similar to that of Beef CARDS. Future products will include a significant upgrade for Beef CARDS and a Lamb CARDS package.