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CLASSROOM SOFTWARE FOR "ABC" ANALYSIS

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ABSTRACT

This paper describes a personal computer program developed for teaching the inventory control technique known as ABC analysis.

BACKGROUND

The ABC system of inventory control was developed in 1951 by H. Ford Dickie of General Electric, and has become a standard quantitative application in manufacturing and distribution. While Materials Requirements Planning and Just-In-Time have received more attention recently, these techniques apply to manufacturers with scheduled demands. The less trendy ABC system still applies to the vast majority of businesses that are wholesalers and retailers having unscheduled demands

The three A-B-C categories are based on Pareto's Law (frequently called the "80-20 Rule"), which separates the "trivial, many" from the "vital few. While the partitions are somewhat arbitrary, one reasonable breakdown might show the A category as the 20 percent of the total items carried which contribute the top 80 percent of sales, B items as the 40 percent of the inventory lines that produce the next 15 percent of sales, and the remaining 5 percent of sales would be from C items, the final 40 percent of the inventory lines. Given finite storage space and limited funds for purchasing inventory, an organization would be better able to focus its efforts in satisfying the greatest number of demands for materials it normally provided if it stocked more of the A items, fewer of the B items, and fewer still of the C items.

A strict ranking may relegate some products important to the sale of A items to the lower categories. Batteries for portable radios and film for cameras are examples of complementary products with one being a large revenue producer only if its companion product is available to make it operative and useful. The original rankings may be adjusted by multiplying them by a judgmental critical value," designated as A', B' or C. Two methods are common. In one, the original rankings are multiplied by 1, 2, or 3, which correspond to the critical values A', B', and C The resulting values are then ranked and categorized as the 'adjusted A-B-C' groups. A simplified variation multiplies critical values such as 1, 2, and 3 (another scheme uses 4, 5, and 6) by the quantified original categories (A = 1, B = 2, C = 3). The results are then ranked again to arrive at adjusted A-B-C categories.

PROGRAM DEVELOPMENT AND EXECUTION

The A-B-C method has been included in textbooks for production and logistics courses. A typical example would display demand information for a variety of products offered by a firm. Students would then rank the products, usually by revenue produced by each, draw the required graph, and determine where to separate the categories in order to identify the A, B and C items. The calculations, although simple, require some degree of "busy work for both students and faculty. The tabulations and repetitive calculation formed an ideal opportunity for applying computer techniques, and resulted in a 1400 line, Pascal language program called 'ABC Analysis and Critical Values. ' As compiled, the program requires 31372 bytes of disk space and runs on MS-DOS computers.

"ABC" reduces calculation errors by providing a format for organizing the inventory and sales data, and by performing all required calculations. The students must still grapple with the basic concept of the Pareto Principle, and determine just what is to be graphed and why specific products are Co be considered A items, B items, and C Items.

The executable file (ABC.COM) is run by entering "ABC," After the title display, the user is prompted by a menu to provide inventory data, consisting of a product name, critical value, unit sales volume, price, and direct cost for up to 15 products. An alternative prompt requests a file name for a user to read in data already stored.

"ABC" sorts inventory entries by total revenue, unit sales volume, and total gross margin. The A category is assigned to include the items providing the first 20 percent of specified results, whether revenue, sales, or profit margin. B items will be the next 40 percent, and C items will be the remainder. The two critical value adjustments described above may be selected after any one of the three initial sorts.

Three output options are provided at any stage: viewing the data on the screen, saving a named data file, and printing the output at any stage. Additional menu commands allow corrections to errors in data entry. A sub-menu will direct the user for correcting data, deleting a product, clearing the screen of data, or changing the user's name,

APPLICATIONS AND CONCLUSION

ABC' provides a graphic teaching example in a class room setting when the computer output is fed to a liquid crystal display (LCD) panel placed on a standard overhead projector. For lecture halls without built-in computers, a portable unit may be used. Live presentation of "ABC" accomplishes several objectives. First, it allows the teacher to show how a simple product list may be entered (and corrected, when necessary). This activity may help ease the apprehensions of some students who have no prior computer experience. Second, the students will see different sorting routines concurrently with the instructor's explanation. The third advantage of this on- line presentation is that it is a more efficient; means of teaching than using the blackboard or a "canned' transparency presentation.

The natural extension of the in-class, computer-aided lecture is further individual study. The students are assigned to develop their own lists of products, prices, margins, and critical values, and then perform the sorting routines. As teaching staff and students come to see the advantages of computer presentations coupled with individual assignments, both sides will encourage development of additional programs of the type demonstrated by 'ABC,'