Teaching DOS and Windows DBMS Packages: A Comparison

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Abstract: This paper is about the differences we have found in teaching a DOS-based (R:BASE 3.1) versus a Windows-based (Paradox) database package in an introductory computer class. We offer a synopsis of our experience in the two environments, along with a few tips for the instructor considering changing to a Windows database environment. We feel this is a timely and appropriate experience to share with other educators since many schools are facing the decision to switch over to the Windows environment.

KEYWORDS: Database Management Systems, Curriculum Design, Windows environment

Introduction

In an introductory computer class, where many new concepts are discussed and the student uses a variety of computer software packages for the first time, it is especially important that the major aspects of a software package (when to use it, what sort of data is used in it, how can the data be manipulated with this package, etc.) be clearly communicated to the student. This is affected, not only by the ability of the instructor, but also by the software package itself. Some are so well designed that they seem almost self-teaching. With others, the students have such difficulty just using them that the basic function of the package

becomes obscured by the necessity to master a lot of complex commands.

In recent articles, it has been pointed out that businesses tend to adopt new technology more quickly than do Schools of Business [1] and that many businesses are already using Windows-based products rather than DOS-based ones. However, educators continue to teach predominantly DOS-based database packages. A recent survey of MIS faculty [2] reported that dBASE (a DOS-based DBMS) is used by 74% of the responding instructors. As educators, we must support the movements into new areas of knowledge [3] while balancing the usually restricted budget for new hardware and software.

In the course we teach, a required course for undergraduate business majors, half of the semester is spent on textbook concepts and the other half is spent on hands-on computer use. The lab we currently have is equipped with Gateway 2000 486/33s with 8 Mb RAM. The student is exposed to DOS, Windows, a spreadsheet package, a database package, and word processing. The word processing is done in Word Perfect for Windows, while the spreadsheet (Lotus 1-2-3 R2.3) and the database (R-Base 3.1), up to this semester, were DOS versions. We switched to a Windows database this fall (Paradox) and will be changing to a Windows spreadsheet (Excel 4.0) next semester. This paper is about the differences we have found in

teaching a DOS-based versus a Windows-based database package. We offer a synopsis of our experience, along with tips for the instructor considering making the change to a Windows database environment.

Since the majority of the students in this introductory class are first-time computer users, we had an audience with neither DOS nor Windows preferences established. Prior to their exposure to Paradox for Windows in the semester, the students had used Windows (2 weeks) and Lotus 1-2-3 R2.3 (3 weeks), so their use of the two environments was roughly equal.

The DBMS Experience with R:BASE

We had originally selected R:BASE, and continued to use it for several years, because we felt it was a very good relational product for the microcomputer environment. Recent releases of R:BASE continue to have good reviews within the academic community [4]. As experienced computer users, the group of instructors teaching R:BASE found its major strengths to be in clearly demonstrating relational concepts such as table structure, domains, multi-attribute keys and joins. We felt it would be an excellent teaching tool to introduce database concepts and use to the novice computer user. The student's point of view, as we were to discover in the classroom, was entirely different.

We taught the database segment for nearly three weeks, covering relational database concepts first and then working through major portions of the R:BASE Sampler by Microrim [5] in the lab. Topics that we covered in the Sampler include entering and editing data, creating and using single as well as multi-table forms, building queries, and running and modifying reports.

The students found R:BASE to be overwhelming for a brief introduction to the world of database management systems. Though it was viewed favorably with more advanced classes, who spent the entire semester on databases, the majority of beginning students felt, after three weeks, relieved to go on to another topic. Typical comments from the students in this introductory class were: "...it took time to become comfortable with the package...", "I was disappointed with the lack of icons and found it dull especially after having been exposed to Windows...", "it was difficult to explore in an unstructured environment outside of the classroom without an instructor's guidance...", "things don't look the same printed out as they do on the screen", "I got the big picture, but I couldn't get the software to operate". Students frequently commented that R:Base was not user-friendly and that the Help facility was difficult to understand. Over a period of several semesters, we added our own notes to the R:BASE Sampler and changed the way some topics were handled, but we never reached

the point where the students finished the database segment wishing they could spend more time on it. They continued to view DBMSs as "the hard part". Their enthusiasm here came with the announcement of the end of this topic.

We felt that some of the students' dissatisfaction might have been due to working in a DOS rather than a Windows environment. However, the environment alone did not explain all of the dissatisfaction because the students had just completed three weeks on a DOS based version of Lotus 1-2-3 and had no complaints at all about the lack of GUIs or other aspects of the user-friendliness of the package. Another source of dissatisfaction was the R:BASE Sampler itself. The students found it to be obscure, riddled with typographical errors, and mismatched with its accompanying data disk. Despite an extensive search we could not find an R:BASE book which was suitable for this class: small enough for three weeks, readable, error-free, and covering the basic concepts of database management systems.

The DBMS Experience with Paradox for Windows

We had planned eventually to move to an all-Windows environment by the fall of 1994, but the difficulties students experienced with R:BASE motivated us to switch to a Windows-based package for databases a year ahead of schedule. Since the

effectiveness of our database segment is obviously affected by the students' perceptions of the software's usefulness [6], we wanted to select a DBMS which would appeal to them. None of the instructors had much experience using a Windows database package and so we anticipated difficulties the first semester. We were pleasantly surprised. Both the instructors and the students found Paradox for Windows to be intuitive, user-friendly, and an ideal vehicle for transferring the concepts of databases from theory to practice. Industry users also rate this product highly. A recent judging of database products on the market rated Paradox for Windows as the top Windows DBMS in the market [7].

In Paradox, the following topics were covered in each class: making a table, entering and editing data, making a form, constructing both single- and multi-table queries, creating reports, and creating graphs. In addition, students who completed their assignments before the class as a whole tended to spend their extra time exploring other features on their own.

Student responses to Paradox included: "I got comfortable with the package very fast..." "I learned and can do a lot more with Paradox than with Lotus in a lot less time...", "How easy it is to create professional-looking forms and reports...", "This is easy and fun to use...", "Everything was so straightforward...I would rather use Paradox than any other package", "It's really easy

to make queries...", "I would like to purchase this program". In other words, the students became enthusiastic users of a database product. They not only enjoyed using Paradox for Windows, but more crucial from a pedagogical standpoint, they wanted to extend their experience, to continue using this product in the future.

Not only were the students impressed with the package, but the instructors were too. Without exception, we reported back that our classroom experiences were very positive. The students looked forward to the lab time and were able to complete assignments. They not only grasped the workings of the DBMS package, but understood (on the basis of later exam results) the basic concepts of relational databases as well. Paradox for Windows had surpassed our expectations and given us a course segment we could look forward to teaching.

Comparison of the two DBMS Experiences

From a pedagogical point of view, it would be appropriate to compare the two DBMS packages with respect to the learning that takes place on two levels: skill and knowledge. We can ignore higher levels of learning such as abstraction, conceptualization, and integration since we are dealing with an introductory course for all undergraduate business majors.

Any relational DBMS package has to convey the basic skills of

creating and using tables, editing tables, making forms, reports, and queries at a minimum; generating graphs will be an optional advanced skill. The basic knowledge that a student has to get from a relational DBMS package will include the concept of a relation, a key --both single and multi-attribute -- and enforcing multi-attribute keys. All of the above is summarized in Table 1.

Table 1. Levels of DBMS Learning

SKILLS	KNOWLEDGE
Create Tables	Relation
Edit Tables	Keys: Single & Multi-Attribute
Forms	Easy Enforcement of Keys
Queries	
Reports	
Graphing	

While Paradox conveys all of the above skills, R:BASE does not provide the advanced skill of graphing. Similarly, Paradox can provide all the basic knowledge listed in Table 1, but R:BASE cannot enforce multi-attribute keys easily: the student has to create a complex rule to do that. These differences in skill and knowledge level learning between R:BASE and Paradox are summarized in Table 2.

Table 2. Comparison of the two DBMSs

DBMS Learning Level	R:BASE	Paradox for Windows
Create Tables	Yes	Yes
Edit Tables	Yes	Yes
Forms	Yes	Yes
Queries	Yes	Yes
Reports	Yes	Yes
Graphing	No	Yes
Relation	Yes	Yes
Keys: Single & Multi-Attribute	Yes	Yes
Easy Enforcement of Keys	No	Yes

Teaching Tips

We offer the following suggestions for an instructor considering the change to Paradox for Windows.

1. If the students have not been instructed in the use of Windows in this class, spend a few sessions introducing or reviewing Windows. Familiarity with basic Windows commands makes any other Windows package much easier to use.

2. Before going to the lab, devote one classroom lecture to an overview of relational database structure and the purpose of forms, reports and queries.

3. A simple, well-written book with good exercises makes the job easier. For example [8], Ellis' First Look at Paradox for