A Comparative Study of Multimedia Personal Computing and Traditional Instruction in a Business School Curriculum

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This study compares the effectiveness of classroom instruction and multimedia personal computing (MPC) instruction to teach undergraduate business school majors the principles of Lotus 1-2-3, WordPerfect 5.0, and dBase III+. The effectiveness of three interactive videodisc courses was compared to the effectiveness of regular, traditional, lecture classes (TI). For this study, two groups of approximately 55 students each, were randomly selected from 15 sections of an introductory, undergraduate, business school program. For all three courses the posttest scores of the MPC students were higher than those of the TI students; in two of those cases, the differences were statistically significantly higher. In addition, there was no difference in the total average learning time for both groups. Students in the MPC group, surveyed about their learning experience, indicated exceptionally positive attitudes towards the courses they had used and to MPC in general.

Computer Based Training (CBT) has become widely used and highly successful training practice among many cost conscious businesses. Much of the popularity of CBT is based on reports that describe the benefits of the technology for a broad base of learners in many different subject areas (DeBloois, et al., 1984; Maher, 1988). Companies often find CBT especially attractive because they are able to demonstrate cost-benefits that can be realized from its use (Boeing, 1981; Brandt, 1987).

Within the last 10 years, CBT courses have greatly improved as a result of advances in course design techniques, course authoring software, and courseware delivery hardware. Many of those improvements are attributable to the evolution of personal computing methodologies and to products based on interactive videodisc technology (IVD) (Graham, 1986; Comcowich, 1989). Personal computer-based CBT courses embellished with multimedia effects have made CBT courseware more appealing and popular than ever before (Reisman & Carr, 1991). This can be seen in the use of an increasingly large number of courses advertised in commercial MPC catalogues (Pollak, 1989).

As multimedia continue to become increasingly popular in the design of new computer applications, educators require empirical evidence regarding the effectiveness of these more complex and expensive applications. Although the inherent technology of IVD, which is analog, differs from all the digital-based technologies of all the new MPC products, the characteristics of IVD applications are almost identical to those of MPC applications. (Additional information regarding emerg-
ing MPC technologies can be found in (Philips International, 1988; Luther, 1989; Microsoft, 1991; Bunzel & Morris, 1992).

Despite this growing popularity, primarily in training and secondarily in education, it is not clear that MPC is as effective as many believe. Often, reports of its effectiveness do not include thorough descriptions of the nature of the conducted research. In a review of the effectiveness of 16 IVD-based MPC training studies, DeBloois et al. observe “that many of the studies use inadequate research models, too few subjects to generate statistics of any power, non-randomized approaches, inadequate controls, and so on” (1984, p. 52). In a similar review of effectiveness studies, Maher notes “the generally poor quality of much of the research [though] some of these studies are illustrative of the way videodiscs are being used in industrial training” (1988, p. 9).

Probably one of the most popular forums for the presentation and dissemination of MPC-related information are the annual conferences on Interactive Instruction and Delivery sponsored by the Society for Applied Learning Technology. A review of the proceedings of those meetings reveals that in 1988, of the 36 presented papers, only four contained a description of research methodologies used to assess the effectiveness of multimedia (Salt Proceedings, 1988). The situation was relatively unchanged in 1989 when only three of the 35 papers contained a discussion of methodologies used to assess effectiveness (Salt Proceedings, 1989). Certainly this does not mean that well designed studies are not being conducted. It does mean however, that fewer reliable data exist than one would surmise.

Described here is a study that was conducted to formally assess the effectiveness of MPC and to determine if the technology could be practically and effectively used by students enrolled in an introductory, undergraduate, business school course. This study was designed 1) to compare the achievement of students using MPC with students who receive their instruction (on equivalent learning objectives) in a traditional manner; 2) to assess students’ perception of MPC as an instructional medium; and 3) to assess the practicality of providing this kind of individualized instruction in an environment accustomed to traditional instructional methods. Because there does not currently exist a large repository of instructional materials based on newer MPC technologies, interactive videodisc technology was the basis for the MPC components of this study.

### Method

#### The Curriculum

Students enrolled in a three unit, one semester course entitled MS265: Introduction to Information Systems and Programming were selected for this study. This course, prerequisite to the undergraduate business program at California State University, Fullerton, consists of three major topics. These are 1) principles of information systems, 2) introductory computer programming, and 3) basic principles of productivity software. The productivity software is a spreadsheet (Lotus 1-2-3), a wordprocessor (WordPerfect 5.0), and a database manager (dBase III+).

Approximately 15 sections of this course are offered each semester. The course objectives for all sections of this core course are defined and standardized by interdepartmental CSUF business school committees to meet AACSB requirements. Furthermore, each year, one faculty member is elected to serve as the course coordinator, specifying the syllabus to be used by the instructors of all sections of this course.

#### Subjects

From the 15 sections of MS265 that were offered during the semester, five were randomly selected for this study. Two of those five sections were randomly selected to receive MPC instruction (S1); the remaining three sections received instruction in a traditional lecture format. Of those three sections, two were taught by one instructor (S2) and one was taught by another instructor (S3). Neither of the instructors was involved with the MPC group. Table 1 summarizes the allocation of instructional treatments for each group.

#### Procedure

**MPC Instruction.** Three different MPC modules were used to deliver instruction to S1. Each module was designed to provide criterion referenced, individualized instruction in Lotus 1-2-3, WordPerfect, or dBase III+. The modules that were used in this study employ MPC methodologies together with a unique software feature.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>INSTRUCTIONAL TREATMENT</th>
<th>NUMBER OF SECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>MPC</td>
<td>2</td>
</tr>
<tr>
<td>S2</td>
<td>Traditional</td>
<td>2</td>
</tr>
<tr>
<td>S3</td>
<td>Traditional</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 1: Group/Treatment Allocation**
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