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AUTHOR	Lippert, Susan K.; Granger, Mary J.
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ABSTRACT

Many university business schools have an instructor-led course introducing computer software application packages. This course is often required for all undergraduates and is a prerequisite to other courses, such as accounting, finance, marketing, and operations management. Knowledge and skills gained in this course should enable students not only to understand "the mechanics" but also to apply learned skills to more complex problems during their business careers. Many entry-level positions, regardless of the discipline or industry, require some knowledge and understanding of several software application packages. Therefore, students in this first information systems course usually learn World Wide Web searching techniques using a browser, an operating system, a word-processing package, a spreadsheet package, and some presentation graphics. This paper summarizes problems with the formal instructor-led computer lab and provides some additional rationale for selecting self-paced software over traditional classroom instruction. The outcomes of 24 students using self-paced multimedia instruction to learn Windows 95, Netscape, Microsoft Word, Excel, and PowerPoint are reported. Students completed an initial questionnaire and were pre-tested on Excel. At the end of six weeks, students completed an exit survey and were pretested on all applications. It was concluded that the self-paced software offered additional benefits to the lecture-based presentation. (Author/MES)

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TIRED OF TEACHING SOFTWARE APPLICATIONS?

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Susan K. Lippert
George Washington University

Mary J. Granger
George Washington University

U.S. DEPARTMENT OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

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Instructor-lead instruction is not the only way to learn software application packages (Harp, Satzinger, Taylor 1997). Many university business schools have an instructor-led course introducing computer software application packages. This course is often required for all undergraduates and is a prerequisite to other courses, such as accounting, finance, marketing, and operations management. Knowledge and skills gained in this course should enable students to not only understand "the mechanics" but also apply the learned skills to more complex problems during their business careers. Many entry-level positions, regardless of the discipline or industry, require some knowledge and understanding of several software application packages. Graduates of a business school are expected by their future employers to have mastered these productivity packages. Therefore, students in this first Information Systems (IS) course usually learn World-Wide Web searching techniques using a browser, an operating system, a word-processing package, a spreadsheet package and some presentation graphics. This paper provides some additional rationale for selecting self-paced software over traditional classroom instruction and also reports the outcomes of 24 students using self-paced multimedia instruction. Implications of this instruction method are discussed. Opportunities for future research are offered.

INTRODUCTION

Many university business schools have an instructor-led course introducing computer software application packages. This course is sometimes an independent class for little to no credit or linked with a survey lecture course in the form of a computer laboratory. It is often required for all undergraduates and is a prerequisite to other courses, such as accounting, finance, marketing, and operations management. The IS'97 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems includes a single prerequisite, the Knowledge Work Software Tool Kit, to the IS curriculum (Davis et al., 1997). This prerequisite to beginning studies in information systems requires basic software package skills including spreadsheets, presentation graphics, word processing, and Internet tools (Davis et al., 1997). IS '97 guidelines recommend that "this material can be delivered as self study modules, as modules associated with other courses using the software, or as a full course" (Davis et al., 1997, 18).

Faculty expect students to produce professional looking papers and presentations which contain information gathered using basic library and on-line research skills. Future employers expect business school graduates to have mastered these productivity packages. Therefore, students in this first Information Systems (IS) course usually learn Netscape and World-Wide Web searching techniques, Windows 95, a word-processing package, a spreadsheet package and some presentation graphics. Within the business school at this university, the integrated software suite taught is Microsoft Office including Word, Excel and PowerPoint.

There are many issues involved when teaching this skills course. Productivity tool instruction is provided during a weekly two-hour instructor-led computer lab held in a classroom environment, which accompanies a weekly two-hour lecture. The weekly two-hour lecture provides instruction in introductory theoretical Information Systems concepts. There are few problems with the lecture portion of the class. However, several issues arise in the formal computer lab.

First, the number of students is restricted to 20 due to a limited number of computers in the computer laboratory. Even this number can create great diversity among student

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participants. Students have different levels of operating expertise with respect to the software applications. These skills, either real or perceived, range from no expertise to those students currently utilizing the products in their part-time or full-time employment. Trying to prepare lectures and homework assignments for this array of skills is challenging. Aiming for the mean skill level causes some students to become frustrated and bored, while others are totally bewildered and lost.

Second, with multiple instructors teaching the same material, there is a potential for inconsistent presentation in terms of content, style, and scope of presentation. Different instructors may feel more comfortable with one subject matter while others have a stronger command of another's content. This difference in content familiarity and comfort may produce inconsistent presentations from instructor to instructor. Additionally, instructors have different presentation styles, which may affect the student's perceived or real quality of the instructor's dissemination of information. Instructors may select different scopes of presentation ranging from a step-by-step method of instruction to offering students possible usages of the products in a business environment. An intended outcome of the instruction is the student's ability to extrapolate from the knowledge and skills learned in order to produce business applications.

Third, students absorb information at different speeds. Some students require individual attention to perform the instructed task while others are capable of performing the task without assistance, causing a difficult learning environment. Some students need to repeat the instruction several times in order to achieve an adequate comfort level with the material. These levels of inequity have existed since these types of courses came into existence and make the learning environment difficult for many students and challenging for the instructor.

Fourth, the presence of computers in the learning environment can act as a distracter to students and the instructor. Students often want to practice the instruction while the instructor is providing instruction. While the hands-on method enables the student to experience the process firsthand, the clicking of keys may be disruptive. Disallowing students to simultaneously attempt the keystrokes during the instruction may frustrate some students whose learning is enhanced through kinetic instruction. Allowing students to simultaneously attempt the keystrokes during the instruction may frustrate auditory learners distracted by the sound of clicking keys. Instructors may find it difficult to compete with the clicking of keys.

These issues raise the question of using self-paced, interactive multimedia software as a replacement for instructor-led instruction of application packages. In an attempt to answer this question, 24 students used a self-paced, interactive multimedia software to learn Netscape, Windows 95, Word, Excel, and PowerPoint. This type of instruction was selected for several reasons. First, it allows students to work at their own pace, based on their initial level of expertise in the application, and to repeat, at any point, an area they are finding difficult. Second, students can use the self-paced software either on their own machine or on a university computer located at a campus computing facility. This affords the student greater control over their time as no designated laboratory is required. Third, the instruction content, style, and scope of presentation are consistent. Fourth, other students may not be present during the student's learning experience. Fifth, instructors answer specific one-on-one student questions as appropriate.

This paper provides some additional rationale for selecting self-paced software over traditional classroom instruction. It also reports the outcomes of the 24 students using this technology, discusses future implications of this instructional method for the productivity packages, and offers suggestions for future research.

RATIONALE

There are several reasons for considering an alternative instruction method for teaching software application packages. However, the questions of why, how and should these packages be taught at the university level arises.

Students and their potential employers expect universities to teach skills and knowledge relevant to their future business careers. All graduates are expected to have mastered these productivity packages. However, in teaching skill-based computer applications, an argument can be made that universities are becoming training centers or technical schools. This also raises the question as to the purpose of universities - educating or training students. "Education seeks broader, more generalizable capabilities, while the goals of training are more specific and task oriented. Education does not necessarily seek a practical or applied end; acquisition of knowledge for its own sake is a legitimate goal of education, but not of training.... The generalizable knowledge acquired in an educational setting often permits the individual to solve problems for which a training program would not be adequate preparation." (Mayo and DuBois 1987, p. 5)

If it is accepted that the purpose or goal of universities is educating, then teaching applications packages at the college level should be abandoned. Training students to use the packages is the development of a skill, where the emphasis is on *skill* rather than acquisition of *knowledge*. Ideally, students should enter their university careers with these skills already mastered. Twenty years ago, when these types of courses were introduced, they were temporary - it was assumed that within a short time, students would acquire these skills in high school or even grammar school. This has not fully materialized and there is still a need for this instruction. The question is how are these skills, given the present student population, to be delivered today.

As mentioned, students arrive in the classroom with varying levels of competence in the application packages. They may be proficient in one or more software packages, needing help in some, but not all. And those they know or think they know are 'known' at various levels of breadth and depth. They also arrive at the university with different learning styles and expectations. Newstron and Lengnick-Hall (1991, p. 46) list "Dimensions for Assessing the Trainee." These dimensions can be applied to students and Table 1 highlights the differences that influence the mastering of application or productivity software packages. Of course these dimensions exist in a lecture-type classroom setting, but the students are acquainted with that environment since first grade. These issues are more obvious within a computer lab/classroom environment; working with computers and software accentuates the differences.

When students can learn the skills required to use the application packages using an interactive multimedia software, concern about some of these dimensions can be eliminated, while others can be become more manageable. Some of the fear of the computer is eliminated, they can work on those portions of the package where they lack skill, and they can work at their own pace and redo portions that are unclear or they are not grasping. In essence they get individual attention. When they are bored, they can quit and return to finish. As they master the skills, they gain self-confidence to explore other areas of the software and expand their skill level. Additionally, they take the instructional software with them. In future courses, the software is available for them to return to unpracticed skills and to learn new ones. Although one of the preferred learning activities to acquire mastery of software is experimenting with software (Harp, Satzinger and Taylor 1997), most students rarely take that approach. Using the software, they can acquire a "learn-to-help-ourselves attitude" (Weldon 1996).

TABLE 1
DIMENSIONS FOR ASSESSING THE STUDENT

1. *Instrumentality* - the degree to which the student is concerned with the immediate applicability of the concepts and skills being taught. Students often do not think past the current course and do not see the relevance of the material until the following semesters	6. *Dominant Needs* - intrinsic and extrinsic individual needs that drive the student - the need for acquiring the skill or the need for a good grade.
2. *Skepticism* - degree to which the student exhibits a questioning attitude and demands logic, evidence and examples. They have heard that there is a great deal of work involved in the class and it is only 25% of their total grade.	7. *Absorption Level* - the pace at which the student accepts new information and masters the skills. Some will grasp one concept quickly and not another, while some are always behind the mean.
3. *Resistance to Change* - degree to which the student fears the course or computers in general.	8. *Topical Interest* - does the student have a personal interest in acquiring the skill. Many do not; some are enthusiastic.
4. *Attention Span* - length of time the student can spend on activity before losing interest. Not only the subject matter but also the instructor can influence this.	9. *Self-confidence* - the degree to which the students independently and positively view themselves - enables them to explore and discover solutions on their own.
5. *Expectation level* - level of quality (process) and quantity (content) that the student requires from the instructor. Students differ in the amount of individualized attention required to successfully complete the task.	10. *Locus of Control* - can the student use the skill without support of the instructor - on the homework assignment, in the following class, in the following semester, out on the job?

The interactive multimedia software also addresses the perceived generation gap between the "Baby Boomers" and "Generation X." These students are part of the "Generation X" learning the alphabet and numbers with Sesame Street and songs. Their values, communications styles and life experiences are different (Caudron 1997). They are more self-reliant, grew up with a computer in the home, expect immediate gratification and are used to being entertained. They can use a computer and get immediate feedback to their solutions, and it is more entertaining than sitting in a computer classroom working at a pace that is either too slow or too fast. When they use an interactive multimedia software for instruction, the onus is placed on them to complete the work, when and where they want - in the computer lab, in the dorm or at home, anytime of the day or night. The interactive multimedia software satisfies these requirements better than the assigned computer lab.

THE EXPERIMENT

Start-up

Volunteers were sought from the freshmen class. They were promised two course textbooks and software provided by the publisher, Course Technologies, specifically for this experiment. Additionally, if they successfully completed the exercises, they became exempt from attending the computer laboratory portion of the course next semester. The first twenty-four students to respond were selected with twenty-one completing the program.

An initial meeting was held in a computer classroom with the participants, the instructor in charge and the graduate teaching assistant. In this meeting, students received the course textbooks, software, data disks, assignments and a calendar with due dates. Instructions for using the software and course textbooks were included with the software. Students were provided with hands-on instruction in using the multimedia courseware. Participants completed an initial questionnaire and were pre-tested on Microsoft Excel. The data supported the belief that the students were less familiar with Excel than Word, and that there would be a greater chance for demonstrating skill enhancement. Due to perceived time constraints, the students were not pre-tested on all the software applications.

Timeframe

Six assignments were included in this program, one for each application and a final assignment that integrated elements from each application package. Students had six days to complete each assignment. Tutorials and assignments were completed independent of a designated computer lab time and classroom; the students worked independently. A computer lab was available for students to use or students could use their own or a friend's computer. Issues and questions were answered over e-mail or by a graduate teaching assistant available two hours per week. The graduate assistant also was responsible for grading the assignments. Graded assignments were returned 48 hours after receipt.

The Final Meeting

At the end of the six weeks, students again met in the computer classroom to complete an exit survey and to be tested on all applications. Students successfully completing the program received credit for the computer lab portion of the class. Successfully completing implies a grade of 80% or better on all the assignments. Students were randomly asked for verbal feedback regarding the software, the process, and the experience.

OUTCOMES

The pre-study questionnaire was administered before the students began work on the interactive multimedia software. Tables 2, 3 and 4 provide some insight into students' perceived level of computer expertise and familiarity with the targeted software packages. When asked at what age they first used a computer, 52.4% indicated they had used a computer at age 7 or younger (Table 2). One participant indicated that computer use began at age 17. The modal age when participants began using computers is age 7. Computer usage could include playing games. A high percentage of the students (91.7%) used computers in high school, had them at home (79.2%) and were able to access one outside of the assigned computer labs (91.7%) (Table 3). The ones available at the University could either be their own, a friend's or a roommate's computer.

TABLE 2
PARTICIPANTS' AGE AND AGE WHEN BEGAN USING A COMPUTER
n=24

	Mean	Range
Participants' Age	18 years	17 – 20 years old
Age When Began Using A Computer	7 years	3 – 17 years old

TABLE 3
ACCESSIBILITY TO COMPUTERS
n=24

	Frequency
Used A Computer In High School	91.7% Yes
Computer In Home While Growing Up	79.2% Yes
Personal Computer Available At The University On Which They Plan To Complete The Interactive Multimedia Courseware Instruction.	91.7% Yes

Most of the students used Netscape, Windows 95 and Word (Table 4). Ninety-five percent indicated they had previously used Netscape Navigator and the same percentage indicated that they had explored the Internet. Thirty-three percent expressed that it would be very easy for them to locate specific information on the Internet. Ninety-one percent indicated they had previously used Microsoft Word while only 29.2% said that they could easily create a Table of Contents in Microsoft Word. However, 50% said that they could generate their resume in Microsoft Word with no problem.

Less than 50% of the students used Excel or PowerPoint (Table 4). Fifty-four percent indicated that they had not used Excel and 45.8% indicated that they would either find it extremely difficult or would be unable to create a spreadsheet containing formulas that would automatically calculate their monthly expenses. When asked if they could generate a graph of their monthly expenses, 62.5% indicated that they were unable or would find it difficult. Only 12.5% indicated that they could create a PowerPoint presentation for use in a formal presentation.

Because the students were going to use interactive multimedia courseware to learn the other productivity packages, it was included on the questionnaire as an applications package. Only 5 students had experience with a similar package. Since such a high percentage of students had computers available throughout high school or at home, the level of usage of Netscape, Windows 95 and Word is higher than is found in a formal computer lab addressing the same subjects. The levels of usage of Excel or PowerPoint are consistent with those found in the formal computer lab.

TABLE 4
PARTICIPANTS' USE OF APPLICATION PACKAGES
n=24

	Yes	No	Don't Know
Interactive Multimedia Courseware*	5	13	6
Windows 95	24	0	0
Netscape	23	0	1
Word	22	1	1
Excel	11	10	3
PowerPoint	5	17	2

* Interactive multimedia courseware is included as an application package

After all the assignments were completed, the students completed an exit survey evaluating the ease of use (Table 5) of the software and its effectiveness to motivate their own learning (Table 6). Since several instructors may be teaching the required computer labs, consistency and quality of instruction is always an issue. Ninety percent of the students rated the interactive multimedia software's response consistent. Additionally, the software allowed the students to control where they were in the package (skip instructions, access specific parts) and to control the pace at which they worked. It appears that the interactive multimedia software met some of "Generation X's" requirements for working at their own pace, any place and any time. The majority of the students reported that the software's feedback on their work was positive, timely and informative, and that the overall motivation was good or excellent (Table 7). Again the interactive multimedia met one of "Generation X's" requirements for immediate feedback.

TABLE 5
EASE OF USE
n=21

	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
Consistent Response	30.0%	60.0%	5.0%	0.0%	5.0%
Ability To Skip Instructions	47.6%	47.6%	0.0%	0.0%	4.8%
Access Specific Parts Of The Program	52.4%	42.9%	4.8%	0.0%	0.0%
User Controlled Pace	66.7%	33.3%	0.0%	0.0%	0.0%

TABLE 6
MOTIVATION
n=21

	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
Package Motivated Student To Learn	19.0%	33.3%	28.6%	14.3%	4.8%
Feedback Was Positive	19.0%	52.4%	23.8%	0.0%	4.8%
Feedback Was Timely	4.8%	61.9%	23.8%	4.8%	4.8%
Feedback Was Informative	14.3%	76.2%	9.5%	0.0%	0.0%

TABLE 7
OVERALL MOTIVATION
n=21

	Excellent	Good	Okay	Poor	Not Useful
Overall Motivation	14.3%	52.4%	14.3%	14.3%	4.8%

As mentioned, in order to be exempt from the computer lab portion, the students had to achieve a grade of 80% or better on the posttests. Twenty-one students participated in the final phase of the experiment. Those that did not, stated that they volunteered for the project to gain the skills that would enable them to complete the computer lab portion of the class with a higher grade. Table 8 contains the averages achieved on the posttest and the number of students passing. It is interesting that the average for the Excel portion is higher than Word; students initially were more familiar with Word.

After working with the interactive multimedia software, overall students improved their performance on Excel (Table 9). Improvement ranged from –1.71% to 38.49%, with one student actually performing worse on the posttest.

TABLE 8
POSTTEST RESULTS
n=21

	Posttest Average	Number Of Students Passing *	Ranges
Windows 95	85.9%	16	70.0% → 94.4%
Netscape	86.9%	20	70.2% → 94.1%
Word	84.9%	18	66.9 % → 94.7%
Excel	84.9%	17	71.8% → 96.2%
PowerPoint	82.3%	15	67.2% → 99.6%
Average Total Score	84.9%	16	72.2% → 94.1%

* Passing is any grade 80% or higher.

TABLE 9
EXCEL PRETEST/POSTTEST RESULTS
n=19*

	Pretest	Posttest **	Difference
Excel Results Average	67.96%	85.03%	17.07%

* Two pretests were invalid.
**One student did worse on the posttest than the pretest.

STUDENT PERCEPTIONS

Student comments, in verbatim, from the exit questionnaire are contained in Tables 10, 11,12 and 13. They liked the concept of working at one's own pace and learning the software. Positive comments are made about the hands-on learning or interactivity, and the ease of use for novices. On the other hand, some with more computer experience thought the software was too elementary. There are a few complaints about the length of the tutorials and their initial complexity. The students felt the software itself was easy to use and navigate. There were some printing problems and at times, those without access to computers outside the classroom lab had to wait for a computer. Additionally, the software recognizes only very specific commands and that annoyed the students. Overall, the students' reactions concerning the experiment and the software are more positive than negative.

TABLE 10
STUDENT COMMENTS ABOUT THE EXPERIMENTAL PROGRAM

Student Likes About The Experimental Program
"I loved the fact that you can do it when you want. Being able to do the work at your own pace, at the time of day/day of the week that is best for me made the program great. I liked having the complete syllabus from the beginning. This way we could plan ahead, see what we will be doing."
"I loved just having a due date and a set of things I needed to hand-in. It was all spelled-out with no confusion."
"Someone who doesn't know much about the computer can use it without outside help. It is also effective in the sense that we can do the tutorial again if we don't understand the material the first time we do it."
"I found the e-course software a close to ideal way of learning how to use Microsoft Office and Netscape. In each tutorial, there were step-by-step instructions and practice sections, which gave you a hands-on way of learning, as opposed to just clicking through and not being able to apply what was given in instructions. The program was very useful in learning the software, which is so much in demand today, especially for someone who has no prior experience with such software. Overall, the program served its purpose and was helpful in learning new software."
"While I was home, my mom's office need to file for taxes. Their accountant asked me to help so that the bill wouldn't be enormous. In any event, I was able to use a spreadsheet and he was impressed. This is definitely applicable to real life."

TABLE 11
STUDENT COMMENTS ABOUT THE EXPERIMENTAL PROGRAM

Student Dislikes About the Experimental Program
"Tutorials, at times, were too long."
"Too introductory for some students. I work at an Internet Service Provider and knew most of this. That's not the fault of the pilot program though. Does the university allow students to test out of the lab?"
"What I didn't like is that the tutorials were so long but that was about it. And even that I didn't mind so much because I wanted to really learn these programs."
"Students should meet with the teacher more than once at the beginning and once at the end."
"In the beginning, it would have been very helpful to have more explanation. The first tutorial sets I did I had problems because I wasn't exactly sure what to do. Perhaps having another "scheduled session" in the early stages of the program in order to facilitate any student difficulties would be helpful."
"When I had a problem, it was hard to get help in a timely manner."
"Since I don't have my own computer, it was sometimes difficult to start working when the lab was full."

TABLE 12
STUDENT COMMENTS ABOUT THE SOFTWARE

Strengths Of The Software
"You can go back and forth in topics."
"Good Examples."
"Ease of use."
"For people who are not familiar with computers it's great. It teaches everything from the beginning. "
"That you can start and stop where you like and take as much time as you need."
"Easy to operate/understand."
"You could set your own pace for doing it."
"It allowed me to use "short-cuts" on my school projects."
"The projects were fun and effective."
"Great help within easy program."
"Good quality of materials for intended audience."
"Self-paced learning is very effective."
"The program was good in every one of its tutorials and was a good teacher."

TABLE 13
STUDENT COMMENTS ABOUT THE SOFTWARE

Weaknesses Of The Software
"We should have more projects."
"The fact that it teaches everything from the beginning is very slow moving for the majority of college students because we are very familiar with everything already. "
"Hard to figure out some of the projects."
"The material might not be comprehensive enough."
"The way it presents the material might not be conducive to long term retention."
"It focuses a lot on vocabulary and I wonder whether this is beneficial."
"Because you're tested on the material shortly after reading it I wonder whether you learn it completely."
"Caused occasional printer errors."
"Software did not work well on my PC – it slowed everything down."
"Program took off points for misspelling."
"The checkpoint results could not be accessed after the first time, you couldn't go back and print checkpoints if you hit continue instead of print."
"There are many ways to do tasks, but usually the computer only accepts one way."

SUMMARY

In order to modify the way application or productivity software packages are being taught, 24 freshmen in a school of business volunteered to learn the same skills using an interactive multimedia software. They used the software independently; that is, they did not attend a computer lab session to receive instruction. Within 6 weeks they completed 6 tutorials and 6 related homework assignments covering Netscape, the World-Wide Web, Windows 95, and Microsoft Office, including Word, Excel and PowerPoint. Those that succeeded in mastering the skills are exempt from the computer lab portion of the required Information Systems class. On the exit questionnaire, the students' reactions concerning the experiment and the software are more positive than negative. Most of the negative comments were constructive criticism. All of the students seemed to benefit from the experience.

Use of the interactive multimedia software eliminated inconsistencies that arise when multiple instructors are teaching the same subject matter. The instructor or help is not always available when needed. Evaluation of the student's assignments by the software is more consistent than that of different (or the same) instructor. Using the software eliminated the inconsistencies between instructors and there are built-in help functions. Therefore, the software offers additional benefits to the lecture-based presentation.

Interactive multimedia software accommodates different learning styles. In a study by Bohlen and Ferratt (1996) both lecture-based training and computer-based training were evaluated for students with different learning styles. They concluded that the computer-based training was more effective for all learning styles. While the purpose of this experiment was not to replicate their study, one of the goals was to accommodate different learning styles for a different generation.

FUTURE

In the past, Freshmen, with the assistance of an upper-class mentor, attempted to learn the basics of the software productivity packages. This was not very successful. All incoming Freshmen students will use this interactive multimedia software in the fall. They will not follow the ambitious schedule of learning all applications using the tutorials and completing all assignments and projects in 6 weeks like the experimental group. It is expected that the tutorials, assignments, and projects will be completed as part of the first year development program over the

students' first year of study. However, students not achieving an 80% on each of the applications packages must redo the work until they pass. They will need this score in order to register for the required Information Systems core course.

By requiring all incoming students to reach a certain level of proficiency, some of the computer lab issues should be mitigated. Instead of the wide discrepancy existing currently, they may all have the same baseline skill level. And this baseline level may be higher than previous attempts at achieving the basics of the application packages. Obviously, there will still be some students with more advanced skills, but the lower end should be eliminated. This will enable the computer lab material to become more relevant and challenging, with advanced topics and opportunities to extrapolate from just learning keystrokes, to completing more complex business problems using these software applications. Some of the advanced topics covered will include developing multiple linked organizational budgets and simulating "what-if" types of questions, generating statistical analysis of this information and understanding the larger implications of the figures to the organization. The instructor can concentrate on educating the students instead of training them.

Faculty members teaching in the MBA program are also interested in the outcome of this experiment. There are MBA students in their classes without the necessary computer skills. Faculty will be able to recommend this type of self-paced, self-learning activity to these students and not have to spend time bringing them to a skill level required to complete MBA assignments.

More companies are investing in training their employees. Everyone, the organization and the employee, benefits with increased productivity and profitability (Bergman 1995). On average, about 1.4% of payroll, $59.8 billion is 1996 (1996 Industry Report), was spent on training and it is projected that 75% of all companies with 50 or more employees will use computer-based training (Bohlen and Ferratt 1996). Since the use of computer-based training is becoming ubiquitous in the business community, the use of the software in the undergraduate business program prepares the students for life-long learning throughout their future careers.

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