INSTRUCTIONAL DESIGN STRATEGIES
UTILIZING INTERACTIVE PROGRAM MATERIALS
FOR ADULT LEARNERS:
A CONTENT ANALYSIS

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the School of Education
Drake University

In Partial Fulfillment
of the Requirements for the Degree
Specialist in Education

by B. J. Reed
September 1996
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An abstract of a thesis by
B. J. Reed
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Interactive technology -- encompassing a variety of teaching tools that have in common the attempt to engage the learner in beneficial response to content materials -- is the focus of this qualitative study based on content analysis of four interactive programs. The programs selected for review were all designed for adult learners in or training for professional roles. Interactive programs included in this study are compact disk-interactive (CD-i) with full-motion video and CD-i without full-motion video (one program with a study guide, one without); and a textbook packaged with workbooks and study aids, but currently no CD-i. Programs were compared on the basis of utilization of unique characteristics, individualization to learners, level of cognitive involvement, interactivity style, and feedback style. This study sought to establish the instructional strategies employed by these interactive programs and how those strategies compare to methods suggested by standards based on current research literature. In addition, a formative analysis was conducted on the textbook/no CD-i package, editing materials as needed to create interactive portions of a developing computer-assisted instructional program.
Acknowledgments

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Chapter 1

Introduction

The presence of computing technology in higher education has become standard. Colleges and universities have dedicated millions of dollars to outfitting the campus -- from computer centers to residence halls. Students are exposed to computers in every major and the use of computing technology in the classroom is increasing. The rationale behind this trend towards technology-based or assisted instruction is that computers enhance the effectiveness and efficiency of instruction and learning. Another contributing assumption is that these learners will use computers extensively in their careers. Utilizing computers in workplace training continues to grow as well, to take advantage of the unique characteristics of computerized technology -- such as ease in performance data collection -- and to provide individualized instruction when an instructor or trainer cannot be made available for each student or small group. Pioneer Hi-Bred International, Inc., with a pilot project testing CD-i technology to train personnel in various locations throughout the world, provided this rationale for their research, "The purpose of this pilot project was to determine whether or not CD-i technology in particular was as effective as standard instruction for Drying System training and whether or not there existed a cost benefit in utilizing it" (1994).

Is the superior effectiveness and efficiency of instruction by computer supported by research literature? To establish increased effectiveness or efficiencies, instruction-by-computer has been compared to other instructional platforms: textbooks, lectures, or study guides. This literature review examines current research reports on the issue of computer-assisted instruction and programmed instruction. The research, however, is of limited value without an examination of instructional strategies across platforms. Logic suggests that more effective design strategies in textbooks, when compared to less effective design strategies in a computer program, would influence the results of research designed to establish efficacy. The research conducted for this study examines the instructional design strategies employed by the programs selected for content analysis, comparing those to the standards suggested by the research literature selected for review.
Does research support the rationale that some instructional design strategies are more effective than others when utilizing interactive technology? This literature review examines current research reports on the issue of instructional design strategies in the following categories: utilizing the unique characteristics of computer-assisted instruction, learner-based instruction, level of cognitive involvement, interactivity, and feedback.

The unique characteristics of computer-assisted instruction include the ability to personalize the context and the efficiency (delivery and study time) of instruction, animation, and flexibility in presentation style. The materials selected for this study were examined for animation, flexibility in presentation style, and other unique characteristics (if any).

Learner-based instruction includes these concepts: presentation sequence and efficiencies; locus of control (internal and external); learner preparation; and learning style differences. The materials selected for this study were examined for presentation sequence and efficiencies, locus of control, learner preparation, and learning style differences.

The level of cognitive involvement refers to the kind of information processing the student is asked to engage in by the instructional materials. Research examined in this literature review focused on these issues: transfer of knowledge, problem solving, and discrimination learning. This study, as qualitative research using content analysis, did not examine learner performance, but did examine the level of cognitive involvement the response requests would encourage from learners.

Interactivity is the method used by the instructional materials to involve the learner. Questions or response requests are tools to create learner involvement. What form that involvement takes -- covert or overt reactions, passive (reading or listening) or active reactions (role playing, drawing, or working out a problem) -- depends on the construction of the instructional materials. Research in this area tends to compare the efficacy of involvement styles by testing overt/active and covert/passive responses and that research was examined in the literature review. This study examined the form of response requests utilized in the programs examined: overt/active or covert/passive.

Feedback has been studied in a wide variety of situations, across animal and human subjects, for years. This literature review focused on studies using adult students, interactive technology, and
comparing types of feedback such as acknowledgment of response (whether the learner's answer was correct or incorrect), knowledge of correct response (KCR) and answer until correct (AUC), as well as internal or external control of how fast to progress through the feedback on incorrect responses. The method for follow-up (when or if to repeat an incorrectly answered question) was also explored by the research considered in this literature review. This study examined the feedback, if any, in the programs examined for KCR, AUC, whether a missed question was repeated, and how advancement in the program was controlled (self-paced or non-contingent/contingent delay and length of interval).

This literature review, then, considered these hypotheses:

1) Computerized course materials will increase adult student performance and efficiency of instruction.

2) The unique characteristics of computerized course materials (personalization, animation, presentation style) will increase adult student performance.

3) Learner-based instruction (locus of control, preparation, and style) will increase adult student performance.

4) Knowledge transfer, problem solving skills, and discrimination learning can be increased using interactive computing technology with adult students.

5) Overt/active responding will increase adult student performance.

6) Knowledge of correct response and external control over the feedback processing time will increase adult student performance.

The research study took the conclusions from the literature review and examined, for comparison, the content of selected programs to establish the instructional strategies employed by these interactive programs.
Chapter 2

Literature Review

Literature Review Research Methods

A search on the Internet (World Wide Web) using a variety of search engines revealed relatively little in potential primary research for this literature review. However, this search did locate several contacts at colleges and universities throughout North America that may be sources for more information (e.g., the University of South Florida's home page on programmed instruction, Krich & Bostow, 1996; see Appendix A).

A search of the ERIC and PsycLIT databases listed most of the research articles reviewed. Others were located by examining the research articles themselves and using the references lists as a guide. All of the research articles reviewed were located in Cowles Library at Drake University in Des Moines, Iowa or Parks Library at Iowa State University in Ames, Iowa (this was not a requirement for selection, but one of the benefits of living within driving distance of two well-stocked libraries).

Quantitative or qualitative research articles were selected on the following criteria: study dealt with adult students as the subjects and at least one of the hypotheses listed in the introduction above. Articles were rejected if the subjects were not adults or if the hypotheses were tangential to the question posed in this literature review. More than 500 possible articles were located on the databases mentioned; 30 articles were selected for review based on the criteria stated.

Articles were analyzed qualitatively, primarily on the basis of how the questions (in some cases hypotheses) were posed and how the procedures were established. Analyses of the statistical methods, where appropriate, are included in Table 1, which appears at the end of this chapter.

Review of Previous Research and Opinion

Table 1 provides a summary analysis of interactive instructional materials research. The last column on this table, "Category", refers to the numbered hypotheses in this literature review:
“1” indicates articles dealing with the first hypothesis: Computerized course materials will increase adult student performance and efficiency of instruction.

“2” indicates articles focused on the second hypothesis: The unique characteristics of computerized course materials (personalization, animation, presentation style) will increase adult student performance.

“3” relates to the third hypothesis: Learner-based instruction (locus of control, preparation, and style) will increase adult student performance.

“4” indicates articles that explore the fourth hypothesis: Knowledge transfer, problem-solving skills, and discrimination learning can be increased using interactive technology for adult learners.

“5” relates to the fifth hypothesis: Overt/active responding will increase adult student performance.

“6” deals with the final hypothesis: Knowledge of correct response and external control over the feedback processing time will increase adult student performance.

**Hypothesis 1.** Thirteen studies are related to the effectiveness or efficiency of computerized instruction. Two meta-analyses were selected, which did not analyze the same research studies (one analyzed studies prior to 1980 and the other analyzed studies from 1988 to 1992) [articles 17 and 15, respectively]. Individual studies were selected if they were not included in the meta-analyses. While both meta-analyses found significant positive effect for computerized instruction [15, 17], the results were mixed in the individual articles. Out of eleven individual studies in this category, five found positive effect [7, 10, 12, 19, 30], five found no significant positive effect [3, 11, 20, 25, 29], and the results of a qualitative study [2] may be related to a confounding variable in all studies (differences between genders or insufficient preparation for learning with computers).

**Hypothesis 2.** Eight studies relate to the second hypothesis of unique characteristics in computerized instructional materials. Two studies relating to personalization of content [3, 24] found positive effect on performance, while two studies found no significant difference in performance effect [1, 18]. Two studies exploring the effects of animation found contradictory results: a positive effect for adult
performance [22] and no significant difference (on final examination scores) [23]. Two studies examining presentation style found positive effect on performance [12, 13].

**Hypothesis 3.** Eight studies explored some aspect of learner-based computerized instruction. In three studies [1, 10, 29] no significant effect was found for locus of control. One study [3] found positive effect for computerized instruction based on level of student preparation; one qualitative study [2] found level of preparation to be a significant factor in signing up for specific courses and attrition; another qualitative study found the students' self-assessment on preparation indicated "below average" for a majority of those surveyed.

**Hypothesis 4.** Six studies dealt with knowledge transfer, problem solving skills, and discrimination learning -- all aspects of using interactive computing technology to reach a high level of cognitive involvement. One study found a positive effect for knowledge transfer with computing technology [14]. One study found a positive effect for problem solving skills with computing technology, with instructor assistance [27], another study found no positive effect for problem solving skills using computing technology [3]. Discrimination learning using computing technology was supported with positive results by three studies [6, 13, 26].

**Hypothesis 5.** Interactivity requires a response from the learner. That response can be passive (reading) or active (typing or clicking the mouse), and covert (thinking) or overt (writing, typing or clicking the mouse). Studies comparing active/overt responses to other types of responses found positive effect on performance with active/overt responses [13, 16, 28]. One qualitative study examined the attitude of students regarding the use of active/overt responses and found their attitude was positive when active/overt responding was required [19].

**Hypothesis 6.** Knowledge of correct response (KCR) and answer until correct (AUC) feedback were studied in three articles (see Appendix C for more definitions). One experiment found KCR/no AUC more effective for low-ability students [4]. Another experiment found KCR/AUC more effective [26]. In the third study, adding the aspect of non-contingent delay time plus correct response before the program can be advanced to the next screen or frame (a 10-second delay) resulted in a positive effect on performance scores [5].
Interpretive Summary of Literature

An analysis of research on the effectiveness of computerized instruction is complicated by the terminology. For instance, the term "computerized instruction" can refer to any instructional content placed on a computer, video, compact disk-interactive (CD-i), or other compact or laser disk technology. The assumption that all forms of technology are equal as teaching tools may be unfounded. Another term frequently used in the literature is "programmed instruction," usually referring to a specific set of instructional strategies utilizing response requests (questions or assignments to promote interactivity with the material) and feedback. Texts can be programmed, just as computers can be. When researchers are comparing the effectiveness of teaching tools, however, they may not be comparing both "programmed" textbooks or study guides and "programmed instruction" using technology as a tool.

Kulik, Cohen, and Ebeling explain that the use of the term "programmed instruction" was more common in the 1960s:

Papers on programmed instruction are rarely found in today's educational journals, and teachers nowadays seldom debate pros and cons of programmed learning. Educators interested in instructional technology have found new causes in recent years: individualized instruction, teaching by computer or microprocessor, or instruction by television or videodisc. Few educators today march under the banner of the teaching machine or the programmed textbook. (1980, p. 52)

A failure to examine the differences between programmed instruction and other methods, though, might serve as a confounding variable in experiments testing the effectiveness of computerized instruction. Susan Meyer Markle (1990) insists that even testing a concept as clear as overt vs. covert responding can be obscured by failure to compare well-designed questions only:

Some early research studies using "programmed" materials failed to show that "active responding" made any difference in what learners found from text... The materials typically presented verbal information and the tests typically asked for recitation or recognition of portions of the information. By now, you should have a fair idea of what sorts of learning "activity" produced such results. Filling in blanks does not produce meaningful processing unless the questions are well-designed. (p. 23)

Other potential confounding variables were noted in an analysis of the research articles selected for this literature review. Bunderson and Christensen (1995) conducted a study of female enrollment and attrition in a computer science program, noting that inadequate preparation through life experiences and a departmental focus on demonstrated ability early in the program were the main factors for decreased
enrollment and attrition figures. Preparation and perhaps gender-related differences could be unappreciated confounding variables. Only six of the studies examined for this literature review revealed the number of female participants, none reported the differences in scores for female and male participants. Such a focus would not imply gender-based inequalities in ability, but could point to gender-related inequalities throughout the educational process.

Having the necessary skills to participate in the study at comparable levels should not be assumed and skill levels can be established by pretesting students for prerequisite skills before the study is conducted. If students lack prerequisite skills to comply with the test standards (e.g., using a keyboard to participate in the study), the results could be significantly influenced. Only a few of the studies reviewed used pretesting as a measure of prerequisites (see Table 1).

The meta-analyses used for this review were based on established statistical measures. However, if the experiments analyzed are not well-designed, the meta-analysis results will be questionable. All of the potential confounding variables mentioned here could put an experiment’s results in doubt. If different teachers provide instruction, one with textbook and lecture, the other with computerized technology and no lecture, the issue of instructional design may be a confounding variable. Neither of the two meta-analyses compared results based on gender-related differences. This could be due to the fact that the studies they analyzed did not provide adequate information for such a comparison.

The value of the meta-analyses is discernible from the discrepancies they do report. Kulik, Cohen and Ebeling (1980) discovered a significant correlation between study outcome and the year the study was conducted. They discussed this finding:

We are uncertain about why treatment effects have been greater and more favorable to programmed instruction in recent years. It seems unlikely that the stronger effect sizes are attributable to use of better research designs. We noticed no great improvement in research methodology over time, and at any rate, our statistical analysis showed little relationship between research design features and study outcomes. It seems more likely to us that programmed instruction has been used more discriminately in recent years. No longer viewed as a panacea, programmed instruction is now used where it can contribute most. In addition, the art or science of programming may have improved so that recent studies involve better programs than the older studies did. (p. 63)
Recommendations for Future Research

Issues for future research are numerous. An exploration of gender-related differences could prove quite interesting. At the very least, more studies using pretesting to establish presence of prerequisite skills would be helpful in evaluating the results of experimentation with adult learners.

The level of cognitive performance is of interest to researchers in both education and psychology. However, only one study (Dempsey, Litchfield & Driscoll, 1993) could be located that compared the effectiveness of questions that are designed for active/overt responding, high-efficiency (don’t fill in the blank, use multiple choice), and meaningful cognitive processing. The concept of meaningful cognitive processing may need explanation, such as that provided by Markle (1990, p. 8), “Making a decision about whether an actual case exemplifies a given (or remembered) definition requires ‘meaningful’ covert processing of the defining attributes given in the definition.” Discrimination learning, as defined by the articles in this review, also comes under the heading of “meaningful processing.” This theory is well-developed by Markle, but supportive empirical research could enhance application of suggested instructional design principles. Indeed, the Pioneer CD-i pilot project recommended such research:

“More research is warranted in the areas which require the training of higher order thinking skills. This research focused on the adaptability of CD-i for skills requiring knowledge, comprehension, and analysis. The adaptability of laser disc technology for systems or concepts which seek to facilitate skills such as synthesis and deduction would require further research” (Pioneer Hi-Bred International, Inc., 1994, p. 11).

Feedback has been studied across a wide range of participants, settings, and variables. However, no research was located for this study that examined the potential effectiveness of the use of “benchmarking.” This term can be defined as providing feedback that includes cumulative performance and may include comparative performance throughout a program. Benchmarking feedback can be optional or automatically provided, continuous or presented at selected intervals.

Based on the comments quoted above from the Kulik et al. (1980) study, a meta-analysis of current research on programmed instruction strategies would be informative, provided enough articles using this instructional design method are available. To increase the body of knowledge regarding
instructional design strategies discussed in this literature review, a meta-analysis on each of the hypotheses presented would be useful.

Finally, a qualitative study of the instructional design strategies used by current interactive programs in comparison to the standards established by Markle (1990) and other research articles reviewed here would be informative.
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<td>Belland et al. (1985)</td>
<td>&quot;...there has been some indication that moderate levels of external pacing may prove to be more effective for overall learning, in terms of amount of content acquired and level of competency achieved with that content.&quot;</td>
<td>Four groups between subjects: (1) self-paced; (2) externally paced plus cognitive processing time; (3) externally paced, no processing time; (4) control group. Five levels for within-subjects analysis included five levels of learning: list, spatial with cued-recall, simple-concept, complex-concept, and spatial with free recall. Measurements of the overall time to complete the program were taken.</td>
<td>100 college freshman in introductory psychology course.</td>
<td>4 X 5</td>
<td>Multiple groups, multiple treatments; 4 X 5 factorial design</td>
<td>selection</td>
<td>&quot;Experimental results supported the hypothesis favoring moderate levels of external pacing...&quot; The EP+CP group performed better on all tests than the other groups, and more constantly as test difficulty increased.</td>
<td>The present study demonstrated that during a self-paced instructional program subjects performed more poorly, in terms of amount learned and performance competency, than subjects in a moderately externally paced instructional program condition.</td>
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<td>02</td>
<td>Bunderson &amp; Christensen (1995)</td>
<td>Why are female students currently enrolling in computer science majors and staying with those programs in numbers that equal low 1970s levels?</td>
<td>Classes chosen to represent the computer science population; random selection of former students selected to represent students who did not stay with the program. Extensive literature review. &quot;(Survey) Responses were grouped into five categories: (1) satisfaction with major; (2) gender discrimination; (3) previous experience; (4) cultural effects; (5) interaction with others.</td>
<td>275 students in any of three computer science classes at BYU; 46 former students.</td>
<td>Survey, majority of closed-end questions; Likert scale.</td>
<td>Qualitative; survey (written questionnaire and phone interviews).</td>
<td>selection</td>
<td>&quot;The most striking finding of this study may be the unrealistic expectations for previous computer expertise assumed by faculty and others in computer science department... Insufficient prior experience with computers, negative experiences in the classroom and with peers, pressure from cultural norms that would move them away from computer science careers...&quot;</td>
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<td>Casey (1996)</td>
<td>Will the application of a cognitive teaching model effect learner outcomes; issues: non-practitioners, diverse levels of prior-learning, metacognitive skills, man-machine interface skills and motivation; ill-structured domains; problematic learning environments.</td>
<td>Course work utilizing laser disk technology, divided into 8 presentations with up to 8 sections per presentation. Testing period for this program held over 12 months utilizing peer review, then 12 learners performing a &quot;walk-through&quot;; final phase was 60 randomly selected weather forecasters who took the course work on the job.</td>
<td>12 and 60, all were US weather forecasters.</td>
<td>Qualitative study; quantitative analysis was not possible, according to authors.</td>
<td>Case study; content analysis.</td>
<td>Instrumentation</td>
<td>Cooperative environments seemed more successful; positive reaction to cognitive teaching model; negative reaction to hypertext without cognitive organizing framework; prior learning and experience influenced the way program was used; learners preferred highly personalized instruction and interaction.</td>
<td>Cost may inhibit development of individualized instruction; need for several &quot;expert&quot; perspectives to problem solving also requires extensive use of resources; computerized instruction provides opportunity for analyzing how learners read, but cooperative learning environments helped students explore more thoroughly their own cognitive processes.</td>
<td>1 &amp; 4</td>
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<td>Clariana (1990)</td>
<td>1. Is KCR feedback superior to AUC feedback for these low-ability learners? 2. Is focused feedback superior to full feedback for low-ability students? 3. Is the combination of KCR with focused feedback superior to the other treatment combinations?</td>
<td>Four treatment groups; factors include feedback (KCR or AUC), context (full or focused), and past test question type (identical or paraphrased). KCR= knowledge of correct response. AUC= answer until correct.</td>
<td>32 high school students, in summer prep program to qualify for college entrance.</td>
<td>Repeated measures ANOVA.</td>
<td>Multiple groups; 2 X 2 factorial design.</td>
<td>selection regression</td>
<td>Statistically significant findings that KCR improved patient performances for low-ability students studying for ACT exams; significance for context was not confirmed.</td>
<td>KCR may be more effective for low-ability students. However, AUC may be more effective for high-ability students. Taking time into consideration, the KCR treatment was also more efficient.</td>
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<td>05</td>
<td>Crobsie &amp; Kelly (1994)</td>
<td>&quot;Imposed post feedback delays promote discrimination training; the present experiments determined whether they also improve performance in programmed instruction.&quot;</td>
<td>Course materials based on Skinner’s (1968) course on behavior analysis, with 1,711 frames presented in a linear format. Incorrect responses were handled by returning to the question with review information after all questions in that set had been attempted at least once. Each participant received all treatments.</td>
<td>8 college students (4 in each of two studies), behavior analysis course.</td>
<td>Ordinal data; sign test on percentage of correct answer; comparison of performance during treatment to baseline data.</td>
<td>Multiple treatments, small groups.</td>
<td>selection instrumentat ion</td>
<td>NCD produced better performance than the other conditions in both studies; additional study time appeared to be the factor in these results.</td>
<td>NCD seems to improve performance because it forces students to spend greater periods of time on task, which frequently leads to higher achievement. Although the racing hypothesis has a reasonable theoretical basis, it was not supported by the present data. The underlying assumption: students used the NCD treatment to restate the answer (additional &quot;practice&quot;).</td>
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<td>06</td>
<td>Dempsey et al. (1993)</td>
<td>Examine the effects of four methods of feedback delivered within a question-based, concept and rule-learning environment; also, probe the complex relation between types of corrective feedback and types of errors made by learners during CBI and on retention test.</td>
<td>Random assignment to one of 4 groups: (a) KCR only; (b) KCR and forced CR (click on correct response to continue); (c) KCR and AWA (why answer given was incorrect); (d) KCR and second try (immediate). Types of errors include gross discrimination (far-out non example) or fine discrimination (over generalization, not misconception).</td>
<td>153 undergraduate university students in biology class for nonmajors.</td>
<td>ANOVA, two-tailed t test.</td>
<td>Post test factorial design.</td>
<td>selection</td>
<td>No significant differences on retention across groups. KCR had lower feedback time, more efficient use of time during study and instruction, more fine discrimination but less gross discrimination errors. Feedback study times were twice as long for fine discrimination errors.</td>
<td>This study offers evidence that within an adaptive instructional strategy, simple knowledge of correct response functions efficiently. In relation to another study (see table), &quot;...research in progress casts doubt...that the association between concept classification and expectancy for success is too complex to be modeled by cause and effect.&quot;</td>
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<td>07</td>
<td>Ester (1994-95)</td>
<td>H1: No difference between lecture and CAI treatment groups on vocal anatomy knowledge (VAT) achievement. H2: No differences between the four learning style categories on VAT achievement. H3: No interaction between treatment and learning style on (VAT) achievement.</td>
<td>Subjects were assigned to treatment groups via stratification of college GPA and learning style. Participants were tested and categorized into learning styles (Gregore Style Delineator). The effects of the independent variables, teaching method and learning style, on the dependent variable, VAT and function, were analyzed with ANCOVA, with pretest scores serving as the covariate.</td>
<td>60 undergraduate students enrolled in choral ensembles at a large midwestern university.</td>
<td>ANCOVA.</td>
<td>ABAB, multiple groups.</td>
<td>history instrumention</td>
<td>Results revealed a significant interaction (p &lt; .006) between instructional approach and student learning style. Abstract learners demonstrated significantly higher achievement with the lecture approach, while concrete learners performed equally well with the lecture and CAL.</td>
<td>No student in the CAI group worked with HVA outside the 85-min treatment time, while 48% of the lecture subjects spent at least some time outside of the treatment studying. A longer treatment time may have had different effects upon the achievement resulting from the two instructional approaches.</td>
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<td>08</td>
<td>Evans et al. (1962)</td>
<td>Qualitative analysis - is there a process to follow in development of instructional material that is not based on artistic or &quot;best guess&quot;? The authors examined programmed instruction materials and developed this system to explain the process.</td>
<td>Not reported.</td>
<td>Not reported.</td>
<td>The Ruleg system is used in other research, some of it appearing in this list of research articles. A short list of the conclusions is impossible in this space.</td>
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<td>09</td>
<td>Is the number of students with a background in personal productivity software (programs like Word, PowerPoint, etc.) increasing and should curriculum be altered to reflect this increase?</td>
<td>Qualitative study, based on survey of incoming students. Survey was administered each semester for 4 semesters.</td>
<td>130, 145, 156, and 367 students at Univ of WI, undergraduates in introductory computing.</td>
<td>Frequency counts, expressed in percentages.</td>
<td>Survey.</td>
<td>instrumentat ion Selection</td>
<td>&quot;The results suggest that many students, in most cases more than 70%, rate their skill levels with computing productivity software as 'below average' or 'none'.&quot;</td>
<td>&quot;Given these results, the introductory computing course will continue to focus on productivity software. But since the campus computing environment is shifting to a Windows platform, both DOS and Windows software will be examined in the course.&quot;</td>
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<td>H1: On-line (CAI) study will increase performance on test over course material. H2: When students must actively select on-line study option, on-line study will increase performance on tests over course material.</td>
<td>Experimental group used on-line study system (multiple choice questions over course material) on only one of two possible chapters; feedback consist of correct response and redirection to course reading materials in case of incorrect answers. In second part of study, students in experimental group chose to use the on-line study tools, rather than being required to.</td>
<td>230 undergraduates in introduction to psychology course.</td>
<td>T-test, ANOVA, stepwise multiple regression on test scores, reading skills scores.</td>
<td>ABABAB, two groups.</td>
<td>selection mortality testing history</td>
<td>Computer-assisted study improved test scores significantly, but subjects with higher reading ability improved more; even factoring out reading ability, computer-aided study system improved scores.</td>
<td>This study does not rule out that any externally prepared study aids may improve performance scores. Also, evaluation tests compared student performance on questions other than the study questions, which may measure transferability of concept attainment. Further, these studies, while encouraging, are balanced by discouraging findings: see article.</td>
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<td>Grabe et al. (1990)</td>
<td>&quot;It was predicted that students using the review system would score higher on course exam... It was predicted that... the path analyses would demonstrate a unique relationship between computer review performance and student predictions of examination performance.&quot;</td>
<td>&quot;Path analyses were used to develop a model relating GPA, previous test performance (when appropriate), computer review performance, student predictions, and examination performance for each of three course examinations.</td>
<td>88, 94, 94 students; volunteers from educational psychology class.</td>
<td>Multiple regression analysis.</td>
<td>Unclear.</td>
<td>Instrumentation selection</td>
<td>&quot;The analysis... for prediction error indicated that GPA significantly predicted error scores on all 3 achievement tests. Computer use did not significantly account for variability in prediction error scores on any of the three examinations.&quot;</td>
<td>The data indicated that students benefited from computer study on the first two. &quot;Perhaps the feedback would be more effective if the student were presented with some unique learning opportunities or suggestions when the feedback indicated a particularly poor level of understanding.&quot;</td>
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<td>Greene et al. (1994)</td>
<td>&quot;...we hypothesized that college students would perform better when reading the meaningfully segmented text in the modified version... we also expected that increased speed would result in decreased comprehension... we expected to find an interaction of program version and speed.&quot;</td>
<td>&quot;Two versions of a computer-based program for enhancing reading speed were examined. One program was based on a commercially available program that presents texts as randomly segmented chunks, while the other programs segmented the text at meaningful breaks. College students read six passages at either 350 or 500 wpm and encountered both versions...&quot;</td>
<td>66 volunteers from an undergraduate educational psychology class (two dropped).</td>
<td>MANOVA.</td>
<td>2 X 2 X 2 factorial design with repeated measures.</td>
<td>Selection</td>
<td>&quot;The analysis revealed three main effects and no significant interaction... As speed of presentation increased, percent correct decreased... Means for the percent correct scores were lower for the original version than for the meaningful version... Subjects who encountered the meaningful version first did better overall.&quot;</td>
<td>The authors argue that commercial computer programs for reading instruction should either be based on current research findings or allow for modification by the educators who purchase them.</td>
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<td>13.</td>
<td>What are the combined effects of orienting (advance organizers, etc.), processing (time), and practicing activities on learning from interactive video?</td>
<td>Random assignment to one of the between subject combinations: orienting activity (yes/no), access time (5'20&quot;), and processing activity (guided/not). The within factors included type of learning (facts/applications), and practice (practiced/not).</td>
<td>80 college students, upperclass undergraduate and graduate level in education courses.</td>
<td>MANOVA to test overall effects, ANOVA to test multivariate effects.</td>
<td>2x2x2 factorial design, between subjects and within-subjects.</td>
<td>selection instrumention</td>
<td>Significant effects were found for practice, type of learning, and the interaction between practice and type of learning. Marginal results for orienting activity (reduced access time = better performance; without orienting activity, more access time was needed).</td>
<td>&quot;The findings suggest that practice remains a dominant influence in the instructional effectiveness of interactive video. The effects of practice are most pronounced for factual learning.&quot;</td>
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<td>Structured practice drills will produce higher test scores than &quot;thematic criss-crossing&quot; study program, but will produce lower scores on transfer of knowledge tests.</td>
<td>Study area is the impact of technology on 20th century society and culture, a 5-hour program on computer. All groups, in the reading stage, were exposed to course materials based on three principles of cognitive flexibility theory (CFT). The experimental group was exposed to study aids utilizing two other principles in CFT. Reading tests were administered. Short-answer and essay questions provided measurement of dependent variables.</td>
<td>Two groups, 17 in each; undergraduate students.</td>
<td>Multivariate analysis of variance (MANOVA), repeated measures analysis of covariance (ANCOVA), one-tailed t-test of independent measures.</td>
<td>Post-test, two groups design, with tests to rule out confounding variables due to selection.</td>
<td>&quot;The main results of the study revealed that although the control treatment led to higher performance on the measures of memory for factual knowledge, the more hypertext-like treatment promoted superior knowledge transfer.&quot;</td>
<td>Theory is that students using study systems relying on rote memory will perform well on tests of memory, but they gain &quot;rigid&quot; and &quot;inert&quot; knowledge (they will not be able to use this knowledge in the presence of new stimuli). Several correlations were reported in this study which did not directly relate to the hypothesis; the authors offered this information to encourage new research lines.</td>
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<td>Khalili &amp; Shashaani (1994)</td>
<td>This study is intended to provide information about the effects of computer-based education on academic achievement and to help educational planners in their implementation of computer-based teaching.</td>
<td>&quot;In the present study we quantitatively examine the effectiveness of computer applications at different educational levels by employing a meta-analytic research review of literature from 1988 to 1992.&quot;</td>
<td>36 independent studies on computer applications in K-12 and higher education.</td>
<td>Meta-analysis (means of treatment &amp; control groups added, then divide the sum by the mean of the control group).</td>
<td>selection Instrumentation</td>
<td>&quot;computer applications have a positive effect on students' academic achievement... The average effect size from 151 comparisons was .38... standard deviation.&quot;</td>
<td>&quot;Effects differed as a function of the computer study feature. Effect sizes were higher in studies that used Logo programming language, when different teachers taught the experimental and the control group, when treatment was applied in a period of one to two months, and when subjects were selected from high schools.&quot;</td>
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<td>Krich et al. (1995)</td>
<td>&quot;Instructional contingencies that required the construction of missing key words, with the consequence of having to repeat if incorrect, produced significantly better posttest recall. ... systematically replicated previous research and extended the analysis by using both a group and a single-subject design and assessed its generalizability to different ability levels.&quot;</td>
<td>One group had response requests which required active/overt responses (fill in the blank) to complete; another group was supplied with the answers (click-to-continue viewing); the third group was &quot;passive&quot; with no interaction required in the linear format.</td>
<td>101 college students in a course on AIDS.</td>
<td>ANOVA and pairwise post hoc comparisons.</td>
<td>Multiple groups design; ABAB/BAB A inrasubject design in experiment 2.</td>
<td>selection history Instrumentation</td>
<td>The constructed-response group had the highest mean score, followed by click-to-continue, and passive observation. Performance decline from high to low-ability groups, but they were similarly differentiated in the 3 treatment groups.</td>
<td>&quot;Supplying missing words in frames required students to read more slowly, carefully, and to reread frames. Time taken was, therefore, another relevant difference induced by experimental conditions. Results confirm that active construction promotes recall, and evidence indicates that programmed instruction is appropriate for all student ability levels.&quot;</td>
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<td>Kulik et al. (1980)</td>
<td>How effective is programmed instruction for college students? Under what conditions is programmed instruction more effective? Is programmed instruction more effective for certain types of students or on certain measures of instructional effectiveness?</td>
<td>16 features relating to internal and external threats to validity; as well as 3 features regarding the nature of programmed instruction (branching or linear; based or assisted instruction; unit or whole course) were considered for the analysis. Six other variables related to how programmed instruction was compared to conventional methods.</td>
<td>57 studies.</td>
<td>Meta-analysis, frequency counts, stepwise multiple regression.</td>
<td>Instrumentation Selection</td>
<td>Too numerous to list all here. Examination performance was raised by .24 standard deviation; 1/3 of studies noted a medium to large positive effect for PI, only 5% found similar results for conventional methods.</td>
<td>55% of studies reported no significant difference, but 84% of those that reported a difference favored programmed instruction. Performance gains are classified as small. No significant relationships between programmed instruction and statistical method or setting. The variable most strongly correlated with positive effect of PI was year of study.</td>
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<td>Litchfield et al. (1990)</td>
<td>&quot;It was anticipated that an adaptive sequence... would be superior in facilitating concept learning to an inclusive sequence... study examined the possibility that... examples would be more effective... if they were assigned to difficulty (by a systematic, generalization formula (instead) of subject matter experts.&quot;</td>
<td>Random assignment to four groups, &quot;to complete a computer-based concept lesson designed to teach coordinate concepts and rules (in biology). Presentation sequence was either inclusive, where every question in the program was presented, or adaptive, where the number of questions presented was determined by ongoing performance.&quot;</td>
<td>55 college undergraduates, biology class for non-majors.</td>
<td>Four treatment groups; 2 X 2 factorial design</td>
<td>selection instrumentat i on</td>
<td>The inclusive group actually performed better on retention tests than the adaptive group. &quot;...students in the adaptive groups spent less total time on the computer-based assignment than students in the inclusive groups.&quot; Also, the adaptive groups saw fewer sample questions.</td>
<td>&quot;In this study, the adaptive presentation sequence was expected to result in higher retention scores, less time required to complete the lesson, and fewer examples needed to reach criterion than the inclusive presentation sequence. Two out of these three hypotheses were supported by the findings.&quot; (Retention was not higher.)</td>
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<td>Martin &amp; Bramble (1996)</td>
<td>&quot;This article addresses two aspects of the instruction component of the project: (a) the effectiveness of instructional strategies and methods that were designed and (b) whether or not the students, when taught using these methods, met the stated learning objectives.&quot;</td>
<td>Five courses previously delivered by traditional, personal-contact teaching systems, were revised to meet the instructional design strategies recommended for televised, interactive programs. Rating forms and interviews were used to measure attitudes about equipment and course components including the instructor, interactivity, and design.</td>
<td>275 military students, in a variety of courses (five).</td>
<td>Self-report rating forms, interviews, performance posttests: tabulations of means and SDs on the first two; ANOVA on performance tests.</td>
<td>Multiple groups, one treatment, pretest/posttest comparison in 4 groups; qualitative study also.</td>
<td>selection mortality</td>
<td>All students passed the performance tests, over 90% passed on the first attempt. Students and instructional personnel were positive about the strategies. They rated the learning methods, including the interactivity provided, to be useful and effective.</td>
<td>&quot;...the results of both the quantitative and self-report data indicate that this VTT instruction was successful in helping students master the learning objectives.&quot; &quot;Both students and instructional personnel rated the learning methods, interactivity, and other course characteristics... to be generally effective. Of the ratings, the amount and types of interactivity were most highly rated.&quot;</td>
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<td>McMinn &amp; Foster (1991)</td>
<td>&quot;The computer program described herein was developed to teach students to recognize the problem of sexist language and to use nonsexist language without losing proper sentence structure.&quot;</td>
<td>Students were given a &quot;sensitizing&quot; unit, used to increase awareness to sexist language; in the &quot;identification&quot; stage, students are asked to identify sexist words in a sentence; in the third phase, students were asked to identify mixed plural/singular pronouns; in the final unit, students had to develop grammatically correct, nonsexist sentences. Posttest. The control group did not have the computer presentation.</td>
<td>57 women, 48 men, undergraduates in introductory psychology class.</td>
<td>ANOVA; unpaired t-test.</td>
<td>2 X 2 factorial design, multiple groups; pretest/posttest</td>
<td>instrumentaion mortality</td>
<td>There was no main effect for the &quot;content of presentation&quot; on use of sexist language; no main effects for the &quot;method of presentation&quot; and no interaction effects were found.</td>
<td>&quot;Training in nonsexist language, either by brief lecture or interactive computer assignment, had a modest effect on college students' use of sexist language. A more powerful intervention, such as grading an assignment on nonsexist language or combining computer instruction with classroom lecture and discussion, may be more effective.&quot;</td>
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<td>Pioneer (1994)</td>
<td>&quot;The purpose of this pilot project was to determine whether or not CD-i technology in particular was as effective as standard instruction for drying system training and whether or not there existed a cost benefit in utilizing it.&quot;</td>
<td>CD-i program was developed for specific topic (drying bins and recording information on data management system). Subjects were selected, took pretest to determine ability to record information, experimental group viewed CD-i program and control group had standard instruction, took post test.</td>
<td>20 adults; professional setting (employees)</td>
<td>ANOVA</td>
<td>Pretest/posttest; two groups, one treatment.</td>
<td>Selection Instrumentation Regression</td>
<td>Learning gains = 56% greater; consistency of learning = 50% greater; training compression = 35% greater; learning curve = 60% faster; content retention = 25% higher.</td>
<td>Sample size is small, but may be sufficient as universe for this training topic is small. Not random selection (subjects had no experience). Difficulty in individualization of training content due to time constraints (this lack may have influenced test scores).</td>
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<p>| 21   | Reiser (1984) | Three pacing procedures (self-paced, reward, penalty procedures) will have no effect on four dependent variables (percentage of students who withdrew from course, the rate at which students passed quizzes, the attitudes of students toward course, and performance on final). | Random assignment to three groups, same materials, same requirements with deadlines, different consequences (reward = extra points; penalty = lose points for missing deadline; control = no points either way). | 100 undergraduate students, in introduction to speech class. | Chi-square on withdrawal rate. Multiple-regression on rate of progress. Multiple regression for performance on final. Likert-scale survey; chi-square to compare groups. | Multiple treatments, three groups (one control). | Selection history Instrumentation Withdrawal = no statistical difference between groups. Rate of progress = the penalty group had a statistically higher rate of progress than the control group, but not the reward group. No statistically significant findings on final exam performance. Attitude = no difference. | In rate of progress and final exam performance. GPA was a confounding variable. Student procrastination can be reduced with a penalty system, without affecting attitude or final exam performance. Rewards did not have an effect, but other studies have contradicted this finding. | 3 |</p>
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<td>Rieber (1996)</td>
<td>&quot;Three simulation conditions were studied, each differing on how feedback of the ball's speed, direction, and position was represented: graphical feedback, textual feedback, and graphical plus textual feedback.&quot; Measured tacit knowledge and explicit understanding.</td>
<td>Students used a discovery-method of learning through an interactive computerized program providing feedback in one of three ways (listed above). Game scores (the interactive program) were used to measure patterns of interactivity and learning. The level of overt interactivity was measured, as well as self-reports on levels of frustration. Random assignment to one of three groups.</td>
<td>40 upperclass undergraduate students in introduction to computers course.</td>
<td>ANOVA across factors and separate ANOVAs on game score, interactivity and frustration measures.</td>
<td>Pretest/posttest, three experimental groups; 3 X 2 factorial design.</td>
<td>Selection</td>
<td>Subjects increased explicit understanding with simulation interaction (the game), but no difference was noted between groups. Game score (tacit knowledge) was higher with the graphic feedback group. Interactivity was significantly higher with the graphic feedback group.</td>
<td>Despite better game scores, subjects did not appear to be any more able to transfer what they learned to an explicit test (posttest) of the principles covered in the game. A second experiment tried to eliminate a possible confounding variable of insufficient exposure to the principles, by lengthening the game.</td>
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<td>Rieber et al. (1990)</td>
<td>Whether the ineffectiveness of animation on adult learning is due to maturation effect or to inappropriate or insufficient research is open to question. The role of varied practice activities and their relationship to presentation variables were also studied.</td>
<td>Three levels of visual elaboration (static graphic, animated graphic, no graphic) were crossed with three levels of practice (behavioral, cognitive, none). Practice followed instruction immediately. Behavioral practice consisted of multiple choice questions and KCR in the case of incorrect answers. Cognitive practice consisted of structured simulation. Random assignment.</td>
<td>141 upperclass undergraduates, education majors in an introduction to computers course.</td>
<td>ANOVA and Tukey's, also qualitative analysis of student notetaking and post-lesson surveys.</td>
<td>A 3 X 3 factorial design</td>
<td>Selection</td>
<td>Maturation Instrumentation</td>
<td>No difference between behavioral and cognitive practice groups; significantly better performance on posttests over control group. When practice was not provided, the animated visual group outperformed the other two visual groups. Cognitive practice with animated lessons interfered with learning.</td>
<td>Adult learning was not influenced more by one type of presentation strategy than another. &quot;In this study, such an interactive dynamic was used as cognitive practice activity, and was shown to be an effective influencer of higher level learning, although no more so than traditional approaches.&quot;</td>
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<td>Ross et al. (1985)</td>
<td>If mathematical concepts are presented in familiar contexts, meaningful learning and more favorable attitudes toward the material should be engendered.</td>
<td>Study 1 with education majors, Study 2 was a replication with nursing students. The course materials were in one of 3 contexts: education, medical, abstract. Randomly assigned. Final test and an attitude survey. Course material over probability theory only. Study 3 was conducted in a nursing-majors statistics course, course materials expanded to a full-course (semester long).</td>
<td>14 college students (studies 1 &amp; 2) and 42 students (3), senior level statistics course.</td>
<td>Post-test scores, one-way ANOVA. ANCOVA on each dependent measure Tukey HSD on adjusted means.</td>
<td>Multiple treatment groups.</td>
<td>selection instrumentat</td>
<td>Findings showed the adaptive treatment to be superior to control treatments on achievement and attitude measures; tending to be stronger on transfer items and context-related items.</td>
<td>The culmination of this research is the development of a computer-assisted model to increase the strategy's practicality and sensitivity to learner differences.</td>
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<td>Sawyer (1988)</td>
<td>Conventional study guides have a treatment effect of increasing achievement scores over conventional study guides for college students.</td>
<td>Conventional study guides were used for class in fall semester; computerized study guides were used for spring semester. Answers to specific questions on exams which were identical across groups, were compared. Four groups, two each semester, were totaled and analyzed. 17 students did not complete the course and were excluded from the analyses. Same text and similar lectures in both semesters.</td>
<td>99 students.</td>
<td>ANOVA, frequency of use (study guides), survey.</td>
<td>One treatment, two groups.</td>
<td>instrumentat</td>
<td>&quot;The 64 students using the conventional study guide had higher achievement scores than the 53 students using the computerized study guide (t(115) = 4.75, p &lt; .001).&quot;</td>
<td>That computerized vs. conventional study guides show no positive effect of treatment.</td>
<td>1</td>
</tr>
<tr>
<td>Code</td>
<td>Reference</td>
<td>Hypotheses</td>
<td>Procedures</td>
<td>Subjects</td>
<td>Measures</td>
<td>Research Design</td>
<td>Threats to validity</td>
<td>Findings</td>
<td>Conclusions</td>
<td>Category</td>
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<tr>
<td>26</td>
<td>Sfondilas &amp; Siegel (1990)</td>
<td>Combining discovery and direct instruction (cognitive routine and corrective feedback) in CBT will have a positive effect on learner outcomes in mathematical problem solving.</td>
<td>3 consecutive days; not random assignment (first to sign up was assigned to first group, second to 2nd group, etc); pretest, post-test measures; groups receive cognitive routine (algorithm for problem solving), no CR/no CFP, corrective feedback paradigm (1-later, 3-later, 5-later knowledge of correct response, then on appropriate schedule repeated the missed question again), and both CR/CFP.</td>
<td>152 undergraduates in an algebra class.</td>
<td>T-test, ANOVA, ANCOVA.</td>
<td>2 X 2 factorial (CR/no CR and CFP/no CFP) design.</td>
<td>testing selection regression</td>
<td>Both the CR and CFP had significant effects on written post-test scores, but only CFP had effect on multiple-choice tests.</td>
<td>The combination of CR and CFP was a powerful system for teaching concepts that are formally structured, but these findings may not be applicable to ill-structured domains (social sciences).</td>
<td>4 &amp; 6</td>
</tr>
</tbody>
</table>

<p>| 27   | Shank et al. (1994) | A computer-aided program on abductive reasoning will improve students' abilities to employ a higher level of cognitive involvement in the form of creative problem solving. | The authors created an &quot;abductive reasoning&quot; computer program (freeware). Fashioned after Pierce's (1955) abductive reasoning concept, the author's approach to the program to provide exercises in using this definition (Pierce), &quot;The surprising fact, C, is observed; but if A were true, C would be a matter of course; hence, there is reason to suspect that A is true.&quot; Based on case studies of instructors and their evaluations. | Instructors at various universities who used the program, as well as test subjects. | Qualitative case study. | One-shot. | Instrumentation Selection | The program is beneficial in encouraging creative thinking and problem solving skills, with instructor facilitation. | The author's suggestion for further study, as well as development of supplemental materials to introduce the broad concept of inductive, deductive and abductive reasoning. | 4 |</p>
<table>
<thead>
<tr>
<th>Code</th>
<th>Reference</th>
<th>Hypotheses</th>
<th>Procedures</th>
<th>Subjects</th>
<th>Measures</th>
<th>Research Design</th>
<th>Threats to Validity</th>
<th>Findings</th>
<th>Conclusions</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Tudor &amp; Bostow (1991)</td>
<td>What is the importance of active student responding while using the microcomputer to deliver the contingencies of programmed instruction?</td>
<td>...compared passive reading, covert responding to frame blanks, and actively typing answers to blanks with and without immediate confirmation of correctness. Random assignment to experimental groups. Group 1, frames with no response request. Group 2, frames with answers provided. Group 3, covert responding. Group 4, overt responding. Group 5, overt responding, immediate feedback, with KCR.</td>
<td>75 undergraduates, educational psychology class at the USF.</td>
<td>Effects of a 315-frame program, teaching elements of programmed instruction design, were evaluated by analyzing answers to pastiest generalization questions and an application test.</td>
<td>Multiple group, multiple treatments experimental design.</td>
<td>Instrumentation selection</td>
<td>&quot;...combining the non-interactive performance data (Groups 1 &amp; 2) and the interactive group data (Groups 3, 4, &amp; 5). This comparison revealed a 13% greater gain for active responders than for passive responders.</td>
<td>Results strongly supported the effectiveness of requiring the student to supply fragments of a terminal repertoire while working through a program. Students who could either covertly respond to frame blanks or who were required to overtly respond performed significantly better on the frame generalization post test and followed program rules when preparing elements of new program.</td>
<td>5</td>
</tr>
<tr>
<td>29</td>
<td>Wesley et al. (1985)</td>
<td>There is a positive treatment effect of computer-assisted instruction compared to a text mode of programmed instruction and the cognitive style of locus of control, on subjects' achievement of the integrated science process skills.</td>
<td>Subjects were classified as internally/externally controlled and randomly assigned to receive instruction in the course via computer or programmed text.</td>
<td>81 preservice teachers in science methods classes (6 sections).</td>
<td>ANOVA, t-test.</td>
<td>Pretest, post-test control group design.</td>
<td>Instrumentation selection</td>
<td>Statistical analysis revealed that main effects were not significant. Additionally, no interaction effects between treatments and loci of control were demonstrated.</td>
<td>The results suggest that printed PI and tutorial CAI are equally effective modes of instruction for teaching internally and externally oriented preservice elementary teachers the integrated science process skills.</td>
<td>1 &amp; 3</td>
</tr>
</tbody>
</table>
Chapter 3

Research Method

Research Design

This study is qualitative, based on a content analysis model. In Content Analysis: An Introduction to Its Methodology, Klaus Krippendorff explains that content analysis is often used as a research tool to compare methods to a current standard or to validate methods in current practice:

Although quantification is important in many scientific endeavors, qualitative methods have proven successful, particularly in extracting intelligence from propaganda, in psychotherapy, and oddly enough in computer analysis of linguistic data where qualitative considerations turned out to be fundamental for the development of suitable algorithms.... All systems approaches are concerned with extrapolating differences into new situations. Indeed a large body of literature in content analysis assesses the differences in messages generated by two communicators, by one source in two different situations, differences in audiences addressed, and differences between input and output. (1980, p. 22 and 37)

To validate how interactive programs encourage and facilitate learning, this study compares the selected programs to a standard presented in Design for Instructional Designers by Susan Meyer Markle (1990) and to the research studies reviewed, as well as comparing the programs to each other. Four programs were selected for evaluation:


3) CD-i without full-motion video, including a study guide (CD-I Training, Ltd., 1993, “Welcome to Work”);

4) a textbook packaged with workbooks and study aids, but no CD-i (Daniels, 1989, Performance Management). This textbook/no CD-i package was selected because it was accompanied by a workbook and flashcards which were designed to encourage active participation from learners. Further, study guides prepared by two different instructors using these course materials were available. All instructional
materials and a review of current literature were utilized to develop response requests which require active/overt responses and a high level of cognitive involvement following "RULEG" guidelines (Evans, Homme & Glaser, 1962; Markle, 1990).

Research Method

The programs, because they were examples across platforms, could not be subjected to identical procedures in all cases. CD-i samples were analyzed using the "Data Sheet" shown in Figure 1. As applicable, this data sheet was also used for the workbook, textbook, and other study aids (flashcards and study guides). The data sheet was developed using Markle's (1990) guidelines and conclusions drawn from the literature review.

Inter-rater reliability was determined by rating one CD-i program with two raters working separately, at different times in different locations, completing the data sheet as shown in Figure 1. Reliability was calculated by counting answers with agreement, dividing by total possible agreements, resulting in an inter-rater reliability measure of 95.5 percent. The raters discussed how to complete the form before and following rating sessions to qualitatively measure areas of agreement and definition. The main area of disagreement was assigning RULEG formulae to the response requests. Additional training in formulating RULEG response requests would, the raters indicated, eliminate most of the areas of disagreement.

The first step in developing a new interactive computer-assisted instruction system for the course in performance management was the analysis of the current materials. Then new response requests were written and a preliminary test for clarity was constructed. The new interactive elements were tested on 12 graduate students taking the performance management course at Drake University in Des Moines, Iowa for credit in the first summer session 1995. Participation in the experiment was voluntary and extra credit was provided. The students’ answers were recorded and counted (correct/incorrect) to evaluate the clarity of written response requests. Students participated in four focus group sessions lasting one hour each to discuss their perceptions regarding the current assignment.
Figure 1

Data Sheet

1996 Study

Interactive Program Materials

Observer: ___________________________ Date: __________________

Overview

Program: __________________________________________

Year: __________ Topic (if title isn't clear): __________________________

Producers: __________________________________________

Ancillary instructional materials: __________________________________________

Program type: _____ CD-I _____ CD ROM _____ Computer program

_____ Workbook _____ Study guides _____ Other __________

Review Questions

1. Is an instructional need established by the program? _____ yes _____ no

If yes, how (briefly): __________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

2. Is the program based on a stated task analysis (statement may appear in ancillary materials)?

_____ yes _____ no _____ unknown
Figure 1. Data Sheet - continued

3. Are stated objectives provided (may appear in ancillary materials)?
   ______ yes ______ no ______ unknown

   If yes, record stated objectives (use the back side of this form if needed): 

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. Evaluate objectives on the following items:*  
   Yes No Unknown
   
   Do objectives relate to instructional need? ______ ______ ______
   Do objectives relate to task analysis? ______ ______ ______
   Are objectives covered by content? ______ ______ ______
   Are objectives covered by response requests? ______ ______ ______

   * Rate each objective separately (indicate on this form, use back of form if necessary).

5. Is all content "programmed" (covered by response requests)? ______ yes ______ no

6. How many response requests appear in program? _______________
Figure 1. Data Sheet - continued

7. For each response request, answer the following questions (check all that apply):

<table>
<thead>
<tr>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
<th>#5</th>
<th>#6</th>
<th>#7</th>
</tr>
</thead>
<tbody>
<tr>
<td>calls for overt/active response</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>response can be efficient (i.e., unnecessary busy work has been eliminated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>relates to objectives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>follows RU+EG / EG</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>follows RU+EG / RU</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>follows RU+EG / NEG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>follows other (specify)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>#8</th>
<th>#9</th>
<th>#10</th>
<th>#11</th>
<th>#12</th>
<th>#13</th>
<th>#14</th>
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<tr>
<td>calls for overt/active response</td>
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<td>relates to objectives</td>
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<tr>
<td>follows RU+EG / EG</td>
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<tr>
<td>follows RU+EG / RU</td>
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<tr>
<td>follows RU+EG / NEG</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>follows other (specify)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Use additional forms as necessary to complete analysis of response requests.)

8. To evaluate feedback, identify appropriate items:

<table>
<thead>
<tr>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed/immediate</td>
<td></td>
</tr>
<tr>
<td>Audio and/or visual</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Data Sheet - continued

9. When incorrect responses occur, how does the program respond?

Correct answer is hinted at   yes  no
Rule or example is repeated  yes  no
Additional information provided yes  no
Response request repeated    yes  no
Rephrased response request   yes  no

(Note: If this technique changes throughout the program, please explain.)
Chapter 4

Research Findings

CD-i With Video (Animation)

The program, “Workplace Violence: First Line of Defense,” published in 1994 by Excellence in Training Corporation and Dynex Digital Publishing, was intended for any professional or industrial workplace that wants to train employees to recognize the early warning signs of potentially violent co-workers. The program made the instructional need clear to the viewer, but was not based on a task analysis. Objectives were stated (read by the announcer and appeared in writing on screen). Objectives listed were related to instructional need. The majority (three out of four) of stated objectives were covered by content, and three out of four were covered by response requests. All of the content was not “programmed” (i.e., response requests did not ask the learner to process all of the information in the program; some information was tangential to the objectives). Twelve response requests appeared in the program.

The presentation was conveyed with full-motion, full-screen animation (like television). Limited individualization of sequence was possible with this program (e.g., the learner could choose to skip the presentation and go right to the quiz). Response requests were presented as a quiz and the learner was directed to watch the entire program and then go to the quiz.

Response requests were presented in graphics on screen, with full-stop, partial-screen video. All response requests asked for overt/active responses and all response requests were posed in multiple choice format. Several response requests used the RU+EG - EG* response formula (asking the learner to pick an example for the rule); however, five of 12 response requests asked for EG - EG*/NEG* (asking the learner to pick an example of a rule, from examples/nonexamples in a multiple choice format, without stating the rule; this method calls for discovery learning). Those five response requests were presented after their own full-stop, partial-screen video.
Feedback after correct responses was cumulative and delayed, audio and visual. Incorrect responses received immediate feedback, KCR, and an opportunity at the end of the available response requests to answer the question again. The missed question was repeated once, if missed again the CR was provided, but the question was not repeated a third time. Limiting the time between responses, by external control of advancement to the next frame, increased efficiency (the time spent on going through the program), but the learner could over-ride this feature by using the pause option or by replaying a response request.

A unique feature was noted in review of this program: response requests appeared in random order every time the program was accessed. Only men were shown as violent workers and their victims were men. One supervisor was a woman, one was a man. Workers were mixed. There were men and women narrators, although the two most credible sources of information and policy discussion were men. Learning style differences did not appear to be addressed by content presentation and learner prerequisites were not accounted for. Learners using the program must enter their name on the first interactive frame, requiring use of the CD-i controller. Although much simpler than a computer keyboard (with only three buttons and one cursor control), the CD-i controller may still require some explanation and practice.

CD-i, Without Video: The Pioneer Project

The Pioneer Hi-Bred International, Inc. and Dynex Digital Publishing (1994) program, "Drying System," was intended for employees of Pioneer Hi-Bred International who may not have had experience with the computerized data management system in grain drying technology. This program used photographs and a reproduction of the data management system's input screen as (still) graphics throughout. Considerable variation in sequence was possible with the program's multiple levels of context presentation, accommodating diversity in employee skill levels. However, prerequisite skills to operate the CD-i system were not accounted for (since users will need to operate a data management system on computer, this consideration may not have been appropriate). Learners could even skip portions of the program and go directly to the appropriate quiz, demonstrating presentation efficiencies. Instructional need was not made clear by the program and objectives were not stated. The program was
based on a task analysis (Pioneer Hi-Bred International, 1994). Objectives were stated in the evaluation report, but not in the program. Response requests were in a separate quiz section following each of three modules, which could be accessed from the menu at any time during the program. All response requests called for active/overt responding, with a multiple choice format. The response requests typically followed a RU+EG-EG*/NEG* format, with two questions following a RU+EG-RU* format (see Appendix C for definitions of the RULEG formulae). Some of the content was not “programmed” (not followed by response requests), and that content may have been tangential to the objectives (since objectives were not stated, the answer is unknown). The narrator of the program was male (no “characters” appeared in this training program). Questions required rote memorization only, not discrimination learning or concept attainment.

Feedback was cumulative and delayed, with an audio “congratulations.” Incorrect responses were immediate, providing CR, and were repeated when all other questions had been attempted at least once. Response requests were repeated until answered correct (AUC). A unique situation came up in this program, regarding clarity of instructions. A question asking for the location of a specific recorded number on the data input screen was missed on the initial response by one of the data collectors. The feedback stated that the appropriate number was “... the second number to the right of the word ‘pressure.’” The screen set-up resembled this configuration:

<table>
<thead>
<tr>
<th>Pressure</th>
<th>89</th>
<th>102</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75</td>
<td>114</td>
</tr>
</tbody>
</table>

Which number appears to be the “second number to the right of the word “pressure””? The missed question was repeated two times (until the correct response was provided by the responder). Response requests were not randomized upon repeated program start-ups. When the correct answer was provided, the program moved immediately to the next screen (to the next response request).
CD-i, Without Video: The CD-i Training Ltd. Program

The “Welcome to Work” program established an instructional need in the program and on the package with these words, “Welcome to Work is a self-contained introduction for those about to enter or re-enter work, helping them understand typical organisations (sic) and how to succeed in the modern working environment” (CD-i Training Ltd., 1993). The program package contains the CD-i disk, a trainer’s guide and a user’s guide, the latter two primarily contain duplicate information. No response requests are listed in the guides, but the user’s guide provides space for taking notes and provides an organizational structure in writing for the program. This CD-i program consists of all (still) graphics, which are drawings, not photographs. Objectives are not stated and do not appear in the ancillary materials. If a task analysis was used to produce the program, that analysis is not accounted for in ancillary materials.

All response requests require active/overt responses, but 95 percent of the responses were not efficient (answers needed to be typed in). The CD-i program observed by the rater was a “specimen” with all “anticipated wrong answers” (AWAs) typed in, so the rater could see what happens with all incorrect responses. When a response was correct, the “yes” hot spot should be highlighted, with a paraphrase of the correct answer (KCR) as feedback (immediate). When a response was incorrect, the “no” hot spot should be highlighted, with immediate feedback that states why the answer is wrong and directing the learner to click on the other option. Missed questions were not repeated (no AUC). A final score was listed at the end of the program (when all quizzes after all modules were completed). When the correct answer was indicated by clicking on an optional picture (e.g., which person in the “video” behaved most appropriately?), the correct answer was always on the box to the far right of the screen. Response requests followed modules, providing programmed instruction, with 51 response requests provided. Almost all response requests followed an EG/NEG - EG*/NEG* format, where rules were stated only as feedback to incorrect responses. Four response requests followed an EG/NEG - RU* format. Rules, when stated, were vague, but response requests utilized extreme nonexamples; therefore, gross discrimination
errors (misconceptions) would not be likely. In this situation, fine discrimination errors
(overgeneralizations) may go undetected.

The positions of highest authority in the organization were filled by male characters (appeared to
be middle-aged), the receptionist and lower management positions were filled by young women.
Learners had limited control over the sequence and are directed throughout to the next sequential step.
Learner preparation and styles were not accounted for by this program design.

**Textbook, Workbook, Flash Cards, and Study Guides, No CD-i**

The instructional need for this program, a course in performance management at Drake
University, would be established by the department. The instructional need was not stated in reviewed
materials. Course objectives were not stated in reviewed materials. The workbook provided objectives for
the workbook exercises by unit. A task analysis for the practice of behavior analysis in professional or
industrial settings has been conducted on a national level and served as a guide for the course content
(lecture, study guides and assignments), but may not have been included in the development of the text,
workbook or flashcards. The current course materials do not follow the guidelines for “programmed
instruction.” While current instructional materials include only (still) graphics due to their format,
developing course materials could be captured in a multi-media format (using any of several interactive
technologies that allow for special features such as animation).

Analysis covered all questions in all resource materials, the questions were revised, and tested on
12 graduate students in the class. Course content was divided into 15 chapters, with approximately four
multi-response questions developed for each chapter (multi-response questions might ask for 15 individual
responses per question; e.g., match 15 words with their definitions or examples). A summary of student
responses shows:

- 33 response requests were answered correctly by at least 51 percent of the students
- 19 response requests were answered incorrectly by at least 51 percent of the students
- 9 response requests were answered incorrectly by all of the students.
The focus groups held with the students revealed the following observations: 1) students agreed that terms and definitions were not higher cognitive level, but were necessary and should be included in response requests; 2) students preferred response requests that were accompanied with page number references to the text, so they could review relevant material; 3) students preferred highly organized textbook design, where vocabulary words were highlighted and offset in wide margins for easy reference and study; 3) response requests need to be written so that correct/incorrect answers are clear (e.g., if one response request has 15 elements, is the whole question wrong when one or two elements are incorrect?); 4) students felt that new response requests following the RULEG system were more helpful than study guides or the workbook in preparing for performance tests; 5) the students indicated that tests had a heavy emphasis on memorization and paragraghing, rather than fine and gross discrimination exercises; 6) students felt that response requests requiring fine discrimination and gross discrimination were “more work” or “harder to answer” than response requests requiring parroting or paraphrasing; 7) students felt inadequately compensated for completing the response requests (extra credit points were insufficient); 8) students felt frustrated by the time-lag between submitting the work and receiving the feedback on their response requests (two days to one week). (See Appendix D, Response Requests for Performance Management for a complete listing of response requests written and evaluated.)
Chapter 5

Discussion

Through an extensive literature review and content analysis of interactive programs designed for adult learners, this study examined the following hypotheses:

1) Computerized course materials will increase adult student performance and efficiency of instruction.

2) The unique characteristics of computerized course materials (personalization, animation, presentation style) will increase adult student performance.

3) Learner-based instruction (locus of control, preparation, and style) will increase adult student performance.

4) Knowledge transfer, problem solving skills, and discrimination learning can be increased using interactive computing technology with adult students.

5) Overt/active responding will increase adult student performance.

6) Knowledge of correct response and external control over the feedback processing time will increase adult student performance.

Hypothesis 1: Efficacy

The Pioneer project (Pioneer Hi-Bred International, Inc., 1994) included a detailed quantitative analysis of performance effect. Often, however, programs developed for adult learners are not subjected to such thorough evaluations, whether due to lack of resources or to feasibility (e.g., evaluations of the "Workplace Violence", Excellence in Training & Dynex, 1994, program on the basis of behavioral change are not feasible). Indeed, empirical measurements of efficacy may be misplaced. Wesley, Krockover, and DeVito (1985, p. 608) explain, "Many independent student-related variables can interact and affect learning through CAI. Because of this, global comparisons between groups receiving CAI and some other
form of instruction may not be appropriate." The Pioneer and Dynex program on "Drying Systems" (1994) was quite effective in reaching stated objectives, but the effectiveness of the CD-i program may not be generalizable to other populations, other programs, in other settings. How, then, can we evaluate interactive programs?

Hypothesis 2: Unique Characteristics

"Although the use of hypertext systems for learning complex knowledge has been attracting recent attention, we currently have poor theoretical and research perspectives from which to understand special characteristics associated with learning in nonlinear and multidimensional hypertext instructional systems," claims Jacobson and Spiro (1995, p. 301). Research examining the unique characteristics of interactive programming and strong instructional designs within that programming, will lead to better understanding and, hopefully, more effective application of technology. Hannafin, Phillips and Tripp (1986) encouraged such an approach ten years ago, "While unique instructional attributes may exist, research thus far has failed to detect the differential effectiveness of interactive video versus competing instructional systems. Research focusing on systematic variations in the design of interactive video, on the other hand, has yielded consistent evidence in support of more generalizable and powerful instructional features" (p. 138).

Some of those powerful features were found in this case study. The Pioneer product allowed a high level of individualization, where the learner could tailor the program review to meet individual skills, knowledge, and interests. The Excellence in Training Corporation and Dynex Digital Publishing program, "Workplace Violence," (1994) on the other hand, utilized more of a linear format in presentation (primarily because animation was selected as a tool for presenting content). Current instructional materials for the performance management program serve as an example of the most regimented and linear of formats examined, but the development of a CAI program addition may alter that evaluation.

Missing out on the entertaining features of interactive programs, the "Welcome to Work" (CD-I Training, 1993) program was almost as static and linear as a textbook, without even photographs (stills)
to take the visual program segment to a varied format. No research was located on the need for altering formats for adult learners, such as switching from full-motion animation to still graphics to photographs to partial-screen, full-motion video. Do adult learners benefit from varied presentation formats, and, if so, what is the optimal range in time for format intervals? Future research is required to answer these questions.

One of the exciting features of CD-i technology, as pointed out in the Pioneer Hi-Bred International project review, is that the system can be highly portable and the program can be used at the workplace instead of unrealistic settings (a computer lab, for example). Casey's 1996 study with weather forecasters using CD-i technology is very similar to the Pioneer program, and yielded similar results (Casey's study was qualitative and cautioned that a cooperative learning environment with the CD-i program was more effective than the CD-i program alone). Markle suggests consideration of setting and individual differences, "Practice makes perfect, provided that the learner is practicing under the right...conditions under which the skill or knowledge will be tested and used" (1990, p. 23). The Pioneer program meets these expectations, but the "Welcome to Work" (CD-I Training, 1993) program fell drastically short of such a goal (the scenarios were not realistic and the artwork instead of full-motion scenes or photographs made the scenarios seem even more distant than what the learner will actually experience).

Individualization of the interactive program -- based on learner skills, prior knowledge or experience, and learning styles -- remains an ideal interactive programs are reaching, unrealistically, to achieve. The products developed by Dynex Digital Publishing come as close to individualization as any programs reviewed, but learning styles and skills remain, typically, unaccounted for. Instead, the focus might be better placed on instructional strategies, for the concept of individual instruction -- much like computerized instruction -- as the panacea to all learning difficulties and instructional inadequacies is unfounded by research. The quality of the programming seems to have more impact on performance outcomes than the instructional tool (lectures, computers, one-on-one instruction).
Hypothesis 3: Learner Differences

Grabe, Bordages and Petros examined the significance of student perception about preparedness for examinations in their study, “For study behavior to be efficient and effective, students must be able to perform important regulatory functions. It is not efficient to continue studying material that has already been mastered, nor is it effective to cease studying when understanding has not been achieved and retention is not highly probable” (1990, p. 113). This concept is extremely important when dealing with highly flexible interactive programs that allow sequential freedom to learners. If Pioneer Hi-Bred International, for example, has identified a need for all data input managers to operate at peak efficiency and accuracy, they would have a keen interest in controlling ill-advised racing through content or skipping key areas of new information embedded in the program. Providing literally hundreds of questions in the performance management program materials is a example of how some educators approach the issue of mastery of the content. Having students pass through a program on performance management with a “C” grade (because the student stopped studying when they thought they were prepared, but they weren’t) is considerably different than having an employee race through the “Workplace Violence” (Excellence in Training & Dynex, 1994) interactive program (because they think they are prepared, but they aren’t) — earning a grade below “A” in the latter case is not an option.

How can an interactive program control “racing” or skipping essential program content? The research is still being conducted on this question. The programs analyzed used quizzes, but the raters could detect no system for forcing the learner to move through the program and into the quizzes. The raters did not find reinforcement for answering questions correctly. An assumption of intrinsic motivation may be unfounded. Research on the concept of benchmarking and the practice of feedback may be of value here.

As noted, none of the programs examined provided for learner differences. Belland, Taylor, Canelos, Dwyer, and Baker thought the concept of learning differences deserved attention from developers of interactive programs, “Accommodating learners’ individual differences remains a concern for teachers at all levels. Whether the individual difference is defined as genetic intelligence, as a cognitive style, or as an attitude, these individual difference variables have a significant influence upon learning...” (1985, p.
The programs observed also did not consider the issue of prerequisites -- are the learners adequately prepared to utilize the features of the program and the content? Nor were these programs prepared for the learner who is convinced -- like the subjects in Gau and Madison's (1993) study -- that they have "lower than average" skills. If an interactive program requires a computer keyboard for instance, and the student believes his/her skills on the computer are nonexistent, will that student utilize the program? How can trainers deal with prerequisites the students cannot meet?

Hypothesis 4: Discrimination Learning

The literature review indicated that achieving a high level of cognitive involvement with learners is the goal of well-designed instruction. Interviews with the personnel at Dynex Digital Publishing indicated that they, too, are interested in getting the learner to think, process, and learn through discovery. Following the guidelines of the rules and examples/nonexamples theory seems to be a common approach. The lack of flexibility in how the concept is applied, however, suggests more training (or more trial-and-error learning) is necessary. Appendix C presents a list, though not comprehensive, of RULEG formulae.

The concept of "abductive reasoning" as described by Shank, Ross, Covalt, Terry and Ewiss (1994) is another approach to discrimination learning that deserves some consideration. Shank et al. provides this explanation of abductive reasoning:

The following example can help illustrate the nature of the abductive syllogism in more concrete terms... First, let us look at a deductive syllogism, "All the beans in this bag are white. This bean is from the bag. This bean is most certainly white." His version of an inductive syllogism is, "This bean is from the bag. This bean is white. All the beans in this bag are probably white." Finally, the abductive syllogism would take the form, "This bean is white. All the beans in this bag are white. This bean is possibly from the bag." Deductions operate toward certainty through true statements, induction operates toward verification through meaningful observations, and abduction operates through experiences as given in order to establish some meaningful hypotheses about the state of affairs behind the observations. The first two modes of logic have been explored extensively in education and research, but abduction is comparatively unexplored. (p. 35)

The programs observed hesitated to use a system of providing examples and then asking for a response request about a rule, which could be a reasonable approximation to "abductive reasoning." Yet, both the RULEG system and the abductive reasoning syllogism suggest that learning at higher cognitive
levels is not only possible, it can be desirable in appropriate circumstances. Recognizing opportunities for employing these concepts may be necessary and empirical research on these topics could help drive development of interactive programs that bring learners to a new plateau of cognitive processing.

As developers of interactive programs plan for collection of performance data, they typically plan for correct vs. incorrect data input. Rarely would programs develop a system for determining why a student missed a question. Yet the technology for doing so is in place. None of the programs analyzed provided for interpretation of data beyond simple statistical measures (frequency counts and cumulative percentages). If the content helps the learner begin to grasp the concept, but the learner makes a fine discrimination error (overgeneralizes), the response is counted equally as wrong as the response based on complete misunderstanding of the concept (misconception; a gross discrimination error), with the current methods for evaluation (Dempsey et al., 1993). Dempsey et al., planned for determining why an answer was incorrect by programming the software to recognize anticipated wrong answers (AWA). Since all of the programs analyzed used almost exclusively a multiple choice format, the preferred existing design would be ideal for making these distinctions and evaluating responses on a deeper level.

As Markle explains:

This principle of designing discrimination learning exercises is directly parallel to the identical situation in designing concept learning sequences: learners understand concepts to the degree they can distinguish a specified range of examples from a specified range of nonexamples. Similarly, learners “see” what they need to see to get by at the task they are learning. Any stimulus is defined (limited) for the learner by what it is not. (1990, p. 128)

Hypothesis 5: Interactivity

The literature review indicated that active/overt responding was effective and all of the materials analyzed used this method (the performance management program also used covert/passive response requests). This evidence suggests that active/overt responding is the most powerful method, but contradictory evidence may exist. Even so, as Markle (1990, p. 113) points out, this system has a wisdom, if not a strong positive impact on performance outcomes, “Overt responding is at times essential: when motor responses are being learned; when the programmer needs feedback about the success of instruction;
or as a ‘secretarial’ records when a step is complex. And overt responding probably has another function: in working through a program, I find it easier to make myself behave if I answer overtly -- it’s so easy to ‘think’ answers sloppily. Overt responding is a measure of self-control.”

In addition, overt responding may be useful if benchmarking as a feedback mechanism is employed -- giving the learner an opportunity during feedback to see how they responded earlier. If self-comparison is reinforcing, overt responding will facilitate the use of that tool.

Hypotheses 6: Feedback

Each of the programs analyzed used some form of feedback. The obvious advantage to computerized instructional technology is the immediacy of feedback (as stated earlier, the performance management program materials required two days to one week for feedback). The programs reviewed here, though, did not use feedback to the ultimate advantage: as a learning tool. None of the programs held the correct response for a non-contingent delay (Crosbie & Kelley, 1994); none of the programs highlighted the correct answer as a feedback measure; none of the programs provided additional information to underscore the correct answer. The assumption could be that when a learner answers correctly, that learner must know why, and must be accurate for all the right reasons. But, just as not making a gross discrimination error isn’t necessarily the same as making a correct answer, making a correct answer isn’t necessarily the same as understanding the boundaries of a concept.

“For this reason, feedback is arguably one of the most important attributes of a simulation’s interface. In contrast to the traditional behavioral view of feedback playing the roles of reinforcer and motivator, most current theories of learning stress the information that feedback provides learners,” Rieber argues in his 1996 study on animation (p. 6). Following this argument, as the performance management program materials are developing for CAI, adequate consideration should be allowed for how feedback will be most effectively administered.
The Future of Research

Several studies have been suggested throughout this examination of current literature and interactive programs. Cautiously, empirical research can be evaluated to help select the most effective and efficient methods for teaching adults. Evidence that some of the empirical research results have been influencing current interactive programs has been shown clearly in this study. In 1986, Hannafin et al. wrote, “The rationale for design of interactive video lessons appears to have evolved largely through intuitive beliefs paired with the trial and error experiences of designers. Many of the tacit assumptions regarding effectiveness have little or no empirical foundation” (p. 134). Perhaps, intuition and trial-and-error learning have been effective teachers, or some empirical research is trickling out to practitioners. The programs analyzed here, at any rate, appear to follow at least some of the research recommendations.

There is room for improvement. Use of the information from empirical research is not without some risk, particularly when researchers ask inappropriate questions (e.g., comparing a computer program to a programmed textbook to determine which is most effective, without comparing the design strategies used by both systems), miss confounding variables (e.g., lacking prerequisites necessary to perform evaluated exercises), or set up weak experimental methods (see Table 1).

The end of this discussion rests on design. As Martin and Bramble (1996) explain, “...while technological delivery systems may make an educational program more efficient and more cost effective, ultimately it is how the instruction is designed and developed to make the best use of technology that is the major factor in successful educational programs” (p. 86). Interactive technology -- encompassing a variety of teaching tools that have in common the attempt to engage the learner in beneficial response to content materials -- is the future of education. Whether the interactivity occurs through distance learning, workplace, or classroom technologies, the goal of engaging the learner effectively will be achieved by sound instructional design based on a combination of empirical research, trial-and-error learning, and even, perhaps, intuition.
References


CD-I Training Limited and New Media Productions Ltd. (1993). Welcome to work (CD-i). (Available from CD-I Training Ltd, Freeland House, Station Road, Dorking, Surrey, England RH4 1UL.)


Appendix A

Home Page for Programmed Instruction

The Programmed Instruction Home Page

Welcome to the Programmed Instruction home page at the University of South Florida located in Tampa, Florida.

What is Programmed Instruction?

Programmed Instruction is a teaching technology incorporating instructional principles and
Appendix B

Vocabulary

**AUC** = answer until correct; an instructional strategy requiring the learner to use active/overt responding and doing so until the answer is correctly provided.

**AWA** = anticipated wrong answer; an instructional strategy that considers anticipated wrong answers from learners and provides a program-generated response to the learner on why that answer is incorrect (typically requires multiple choice format).

**Animation** = moving scene on a screen or in a program; does not imply cartoons as the only type of animation, but such animation can be included in the definition; may be synonymous with "video" (however, technically, video can include "static", "graphic" or "still" images).

**Benchmarking** = the provision of cumulative totals of correct/incorrect responses, may also include number of answers given out of total questions, may also include comparative analysis of correct/incorrect responses. Benchmarking can be provided automatically or may be at the option of the learner. Benchmarking is a form of feedback.

**CD-i** = compact disk-interactive; sometimes called laser disc technology, refers to the system of preparing multi-media presentations by computer program, saving to write-only-once, read-many-times compact disk; typically provides opportunity for interactivity with learners, allows learner control of sequence, may provide for performance data evaluation; requires CD-i equipment.

**CR** = correct response (not to be confused with KCR); may be provided by the program or the learner.

**Efficiency** = the amount of time for delivery of content, study and responses.

**Feedback** = a response from the program in relation to a response from the learner; may be in many forms, directed by programming; see KCR, AUC, benchmarking.

**Full-motion** = the image is in motion (like television or movies).

**Full-screen** = the entire image area is involved (like television).
Interactive technology = any system that provides questions or response requests to the learner anticipating a response (active/passive or overt/covert) from the learner; may provide feedback.

Interactivity = how a program engages the learner's response.

KCR = knowledge of correct response (not to be confused with CR); after the question or response is provided, perhaps after the learner has responded, the program provides a correct answer.

Programmed instruction = content material that is carefully planned and presented with response requests to encourage learner involvement.

Response requests = questions or assignments that engage the learner; this terminology appears in Markle's (1990) text on instructional design.

RULEG = a system originated by Evans, et al. (1962) that suggests content can be delivered by a formula using rules (RUL) and examples/nonexamples (EG); allows for designing response requests that can differentiate between low- and high-level cognitive processing, as well as fine (overgeneralization) and gross (misconception) discriminations; also see Markle (1990).
Appendix C

RULEG

The following information appears in several formats references included in this study: Evans, et al., 1962; Markle, 1990; and Kritch and Bostow, 1996 (see Appendix A).

Note that the punctuation marks used to indicate student responses differ with the reference source. The punctuation used below was selected only because of the limitations of the word processing program used to generate this report.

RU, EG + EG* = rule is presented with example, student is asked to respond with an example; may be asking student to use discrimination, could be asking for rote memorization or paraphrasing.

RU + EG* = rule is presented without example, student is asked to respond with an example; is asking student to use discrimination.

RU + RU* = rule is presented without example, student is asked to respond with the rule (rote memorization).

EG + RU* = example is presented without rule, student is asked to respond with the rule; is asking student to use discrimination.

RU, EG, NEG + EG*/NEG* = provides rules and example, student is asked to choose between an example and nonexample; may be asking student to use discrimination.

EG, EG, NEG, NEG + RU* = provides the examples (range) and nonexamples (boundaries), asking student to provide the rule; is asking the student for discrimination.

RU1, RU2 + RU1/RU2* = provides two rules, student is asked to discriminate between them.

RU1, RU2 + EG/NEG* = provides two rules, student is asked to identify which rule applies to the example and nonexample (fine and gross discrimination).

The possibilities go on and on...
Appendix D

Response Requests for “Performance Management”

These response requests were written following guidelines suggested by Susan Meyer Markle in her text, Design for Instructional Designers (1990). The response requests are designed to serve as a study guide and the scores (listed below) were utilized simply to evaluate the clarity of the response requests (not the students).

Notes. Students were given the option to complete these exercises. They were told that they might benefit from this work when they completed course quizzes (quizzes were based on the text and lecture materials; response requests were written to provide practice in gaining mastery of this new material). Since most students finished most response requests, n = 13 in most cases. However, since completion was not mandatory, n = 12 in some cases (one student did not hand in all response requests).

Chapter 1 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term to its corresponding definition by placing the letter of the definition in front of the term.

   ___ data-oriented (c)
   ___ performance management (c)
   ___ intervention (a)
   ___ PM systematic approach (d)
   ___ baseline (b)

   a. “Usually refers to the process of applying performance management procedures to a problem or performance improvement opportunity.” (p. 239 and graphs on p. 9)

   b. “Data collected before a performance improvement effort that provides a comparison with the intervention data for the purpose of evaluating the effectiveness of your intervention.” (p. 237 and graph on p. 4)
c. “A systematic, data-oriented approach to managing people at work that relies on positive reinforcement as the major way to maximize performance.” (p. 240 and p. 4)

d. “(1) Specify the behaviors and results to be affected,
   (2) measure these behaviors and results,
   (3) determine the methods for changing current performance,
   (4) use those methods,
   (5) and evaluate the results.”

e. “Performance managers use data to evaluate the effectiveness of motivational strategies, assuming all performance can be measured.” (p. 4)

100 % correct = 11 students
-2 = 1 student
n = 12 (one student did not submit this exercise)

Notes. Students can demonstrate mastery of these terms if they are able to complete exercises (response requests) that require putting the terminology and concepts to work. However, the instructor of this class wanted a demonstration of at least recognition of these terms. Indeed, mastery of the terms may be more effectively accomplished with exercises like this, but that theory was beyond the scope of this work, which was simply to develop response requests which might be the basis for further research. Markle would not classify this response request as one that requires a high level of cognitive involvement.

2. Circle the letter in front of statements you might hear from someone who does not want to implement PM projects.

a. “I can see where this would work in a repetitive type job, but won’t work in my job because we do different things every day.” (circle)

b. “We use PM throughout the organization already -- we need a better solution.” (circle)

c. “We realize we are having a problem with quality control and we need to find an effective solution.”
d. "This isn't a issue of performance -- those people are just lazy." (circle)

e. "Don’t give me fancy words, just train these people to do their job."

100% = 9 students

-1 = 3 students
Chapter 2 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term to its corresponding definition by placing the letter of the definition in front of the term.

   ____ behavior (c)
   ____ discriminative stimulus (a)
   ____ modeling (f)
   ____ antecedent (d)
   ____ performance (e)
   ____ cognitive antecedents (b)

   a. “A consequence that increases the probability of a behavior occurring in the future.” (p. 242 and p. 15)
   b. “Thoughts, feelings and internal images that prompt behavior.” (p. 238 and p. 15)
   c. “A pinpoint that describes a person’s actions. It is what you see if you observe someone working.” (p. 238 and p. 13)
   d. “A person, place, thing or event coming before a behavior that encourages you to perform that behavior.” (p. 237 and p. 13).
   e. “A number, or series, of behaviors directed toward some goal.” (p. 240 and p. 13)
   f. “The behavior of other people that prompts behavior.” (p. 240 and 15)

100% = 11 students
-2 = 1 student
-2 = 1 student

2. Several antecedents and behaviors are listed below. Organize the words to connect an antecedent with a likely behavior.

   I went to Mary’s house.
When the alarm clock rang, I shut it off and went back to sleep.

Mary called to invite me over.

Makes phone calls to sell a product.

The alarm clock rings.

The quota for calls is established.

When a product is sold, three forms have to be completed and given to the supervisor.

1 and 3 go together. 4 and 6 go together. If “products sold” is considered a consequence of 4, then “products sold” becomes an antecedent for 7. 2 and 5 go together.

100% = 6 students

-1 = 6 students

-2 = 1 student

Note for question above. The most common error (-1 and -2) was linking 4 to 7. Students indicated they needed an example to understand how to perform the response.

3. Behavior can be described as, “A pinpoint that describes a person’s actions. It is what you see if you observe someone working.” Often people attempt to describe behavior by using labels, but labels are not behaviors. Underline behaviors listed below and circle(boldface) the labels.

Tom is a self-starter. He arrives at work promptly, writes up a to-do list to start his day, and follows that list as he works through the day. He asks questions when he needs information, but spends no time during working hours chit-chatting with his co-workers. Sam, on the other hand, needs supervision. He is lazy, unfocused and disruptive. He chats with co-workers, often spending hours each day at non-productive talking. He plays Solitaire on his computer during working hours and rarely makes deadlines with his projects. If Sam doesn’t shape up, we are going to demote him!

Answers are indicated by underlining or boldface type.

100% = 1 student

-1 = 5 students
-2 = 3 students
-3> = 4 students

4. Antecedents have several characteristics.

(1) Antecedents precede the behavior they influence.

(2) Antecedents communicate information about behaviors and consequences.

(3) Antecedents are more effective when they have been paired with consequences.

(4) Consequences may be antecedents.

(5) Antecedents which have not been paired with consequences have only short-term effect.

Underline the antecedents in this example.

Answering the phones in a professional manner in our office is important to our business success. Some calls are not being answered at all, some calls are being answered incorrectly, some calls are put on hold for more than 60 seconds, some calls are misdirected to the wrong person in the office. So, we had a meeting today about phone etiquette. Here are the decisions we came up with: One person will be designated as the primary receptionist each day, and one person will be designated the backup receptionist. In the future, we will allow the phone to ring no more than 3 times before someone in the office answers it. When the receptionist answers, she will ask “How may I direct your call?” If the call is misdirected, the person who receives that call will tell the receptionist how that call was misdirected and who should have receive the call. Calls will not be on hold for more that 60 seconds. When 60 seconds has passed, the phone will automatically ring back to the receptionist and the receptionist will respond by asking, “The person you are waiting for is still busy, do you want to continue to hold?”

100% = 1 student
-1 = 1 student
-2 = 3 students
-3> = 8 students
Note. The student receiving 100% pointed out that the mistakes (some calls...) were antecedents for the meeting (that was not indicated as a correct answer in the first draft). Students pointed out that this exercise was much more confusing than question number 3 above.
Chapter 3 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term to its corresponding definition by placing the letter of the definition in front of the term.

   ___ positive reinforcement (c)
   ___ extinction (c)
   ___ negative reinforcement (d)
   ___ punishment (h)
   ___ positive reinforcer (f)
   ___ negative reinforcer (g)
   ___ behavioral consequence (b)
   ___ reinforcer (a)
   ___ punisher (i)
   ___ contingent (j)

a. “A consequence that increases the probability of a behavior occurring in the future.” (p. 242 - also in Chapter 5)

b. “Events that follow behaviors and change the probability that the behaviors will recur in the future.” (p. 238 and 23)

c. “Withholding, or non-delivery, of positive reinforcement for previously reinforced behavior.” It decreases performance. (p. 239 and 32).

d. “The process by which an aversive consequence is escaped or avoided.” (p. 240 and 30)

e. “The process of delivering a positive reinforcer (favorable, desired consequence).” It increases performance. (p. 241 and 29)

f. “Any consequence that follows a behavior and increases the probability that the behavior will occur more often in the future.” (p. 241 and 29)
g. "A consequence that strengthens any behavior (increases the probability that the behavior will occur in the future) that reduces or terminates the consequence." (p. 240)

h. "A procedure in which a person...gets what he/she doesn’t want after performing...some behavior or performance." (pp. 31, 241)

i. "A consequence that decreases the frequency of the behavior it follows." (p. 241 and 31)

j. "An explicit or implicit arrangement between a behavior and a consequence (usually a positive reinforcer) in which the consequence is available only when the behavior or performance is completed." (p. 238)

100% = 4 students
-2 = 3 students
-3 = 3 students
-4> = 3 students

2. To identify each example below, circle antecedent or consequence as appropriate.

antecedent or consequence: "I told you that you shouldn’t do that."

antecedent or consequence: "If you don’t finish that project by Friday, you will have to come in and do it on Saturday."

antecedent or consequence: Most organizations have some sort of monthly, quarterly or yearly objective setting program (MBO).

antecedent or consequence: You have an employee whose production reports are sloppy to the point that errors occur in the data. Every time errors occur, you lecture him on his handwriting. The problem is getting worse.

100% = 3 students
-1 = 3 students
-2 = 6 students
-3 = 1 students
3. Identify the consequences below as either R+ (positive reinforcer), R- (negative reinforcer), P+ (punishment), or P- (extinction).

____ Something people will work (increase their performance) to escape or avoid. (R-)

____ Any consequence that follows a behavior and increases the probability the behavior will occur more often in the future. (R+)

____ You have an employee whose production reports are sloppy to the point that errors occur in the data. Every time errors occur, you lecture him on his handwriting. The problem is getting worse. (R+)

____ When you see a highway patrolman, you take your foot off the gas pedal. Name the behavioral consequence that is responsible for “driving within the speed limit.” (R-)

____ Your livelihood depends on your driving but you have been warned that one more speeding ticket will cause you to lose your license. Assuming you keep your license, which consequence is maintaining your driving at or below the speed limit? (R-)

____ A consequence that decreases the frequency of the behavior it follows. (P+)

____ Withholding positive reinforcement for previously reinforced behavior, decreasing or stopping performance. (P-)

____ Peer pressure. (R-)

____ Someone is trying to please you and you do or say nothing to them. What consequence are you applying? (P-)

____ Giving a waiter a $1 tip after you and your friends have dined for a couple of hours. (P+)

____ The teacher always (or appears to) calls on the people on the front row to answer questions. Many people learn to sit on the back row. What is the consequence? (R-)

Note. Since the text claims that positive reinforcement is the consequence of choice, this reviewer recommends placing more positive reinforcement examples in this exercise. Is there any value to emphasizing positive reinforcement in this manner?

100% = 0
-1 = 1 students
-2 = 3 students
-3 = 2 students
-4 = 3 students
-5> = 3 students

Note. The most common error (all students missed this one) is the second option (as worded, is this an R+ or an R-?).

4. The characteristics of consequences are:

(a) Every behavior has a consequence.

(b) Consequences follow behavior.

(c) Consequences control behavior.

(d) Immediate consequences are most effective.

(e) The more certain a consequence is, the more influence it has (contingency).

Underline and label the antecedents, behaviors and consequences in the example provided below.

Employee tardiness is a significant problem at our hospital. So management held a meeting to explain

B

new hospital policies regarding lateness and compensation. If an employee “clocks-in” one minute or

B

more late, pay will be docked by 1/2 hour on their next weekly pay check. There are no exceptions.

C

Tardy employees will not be reprimanded by supervisors when they arrive late at their stations:

supervisors will ignore the time of arrival. If an employee receives two “adjusted” paychecks in one

C

month, the supervisor will note that penalty and warn the employee that termination of employment is
possible of tardiness continues. Employees will be reminded of these policies each time their paycheck is
"adjusted." If the employee receives three warnings in one year, termination of employment is mandatory
as soon as the fourth "adjusted" paycheck is issued.

Note. Few students attempted to complete this exercise (most left it blank). Of those who attempted, all missed more than 4 components as indicated above. This exercise needs to be rewritten so students can understand what is expected. The graduate students (evaluating these response requests) suggested that the students need to have direction to locate an antecedent, behavior and consequence sequence to identify in the example(s) provided.
Chapter 4 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term to its corresponding definition by placing a letter of the definition in front of the term.

   ____ ABC Analysis (c)
   ____ C/U (b)
   ____ I/F (c)
   ____ PIC (d)
   ____ P/N (h)
   ____ pinpoint (f)
   ____ N/C (g)
   ____ ABC Grid (a)

   a. “The form used in completing an ABC analysis”. (p. 237 and 38)

   b. “The way of classifying consequences in an ABC analysis that asks the question: How likely is it that the person will receive the consequence?” (p. 238 and 41)

   c. “The way of classifying consequences in an ABC analysis, asking the question: Does the consequence occur during or immediately after the behavior or is it delayed, in the future?” (p. 239 and 41)

   d. “A category of consequences identified in an ABC analysis having a powerful influence on performance.” (pp. 240-241 and 41)

   e. “A problem-solving process in which the antecedents and consequences currently operating for the desired (correct) and undesired (incorrect) behaviors are identified and classified.” (p. 237 and 37)

   f. “A specific description of performance that refers to any action (behavior) of a person or any outcome (result) he produces.” (p. 240 and 43)

Note. See Markle’s comments on gender specific pronouns! This should be rewritten.
g. “A category of consequences identified on an ABC analysis that inhibits performance.” (p. 240 and 41)

h. “A way of classifying consequences on an ABC analysis.” It refers to reinforcement, punishment, and extinction. (p. 241 and 41).

100% = 11 students
-2 = 1 student
-3 = 1 student

2. In the samples below, identify each as P/N, I/F, C/Us, as appropriate.

_____ Although an ABC analysis practically always shows that there are many negative consequences to the performer for poor or low performance, why are those negative consequences not effective in changing the performance? They are usually classified as what? (NFUs)

_____ In a situation where we are not getting the performance we want, what category of consequence is practically always missing for the desired performance? (PIC)

_____ In doing an ABC analysis, what kind of consequences do you always find maintaining the undesirable performance? (PICs)

_____ In doing an ABC analysis on a poor performer, the supervisor listed a consequence of poor performance as “plant production goals will not be met.” How would you classify this consequence for the performer? (NFU)

_____ In a Performance Improvement Plan, you developed to improve the performance of one of your programmers, one of the things you decide to do is to check on her at random and R+ her if she is working at the things she should be doing. How would you classify the R+? (PIU)

100% = 0
-1 = 1 student
-2 = 1 student
-3 = 4 students
-4 = 7, where each response required three letters, so a total of 4 correct responses was possible.

Note. The text clearly shows that a three-letter identification is standard practice. The most common error was that students failed to use three letters to indicate the answer (listing only one or perhaps two correct letters). If this approach is reviewed in class, students should be able to complete this exercise with more accuracy. However, the next few questions are asking for similar information, but in a different manner. The students were much more accurate in the format used below.

3. Circle the “P” or “N” to identify whether each of the following consequences are seen as positive (P) or negative (N) by an employee for the behavior described.

   a. Behavior: omitting typist’s initials at the bottom of a letter.

   Consequences:

   P   N  Avoid being identified if my work is sloppy
   P   N  Avoid being caught if I’ve made errors on the letter
   P   N  Lose opportunity to be rewarded for typing an error-free letter
   P   N  My supervisor reprimands me.

   b. Behavior: writing longer letters than necessary.

   Consequences:

   P   N  Get to explain everything in detail
   P   N  Takes me longer to write the letter
   P   N  Have a better chance of saying what my supervisor wants me to say
   P   N  Boss gets mad because my letters are too long.

100% = 9 students
-3 = 2 students
-4> = 2 students
4. Circle the "I" or "F" to identify whether each of the following consequences are seen as immediate (I) or future (F) by an employee for the behavior described.

   a. Behavior: omitting typist's initials at the bottom of a letter.

      Consequences:

      I F Avoid being identified by others if my work is sloppy
      I F Avoid being caught if I've made errors in the letter
      I F Lose opportunity to be rewarded for typing an error-free letter
      I F My supervisor reprimands me.

   b. Behavior: writing longer letters than necessary

      Consequences:

      I F Get to explain everything in detail
      I F Takes me longer to write the letter
      I F Have a better chance of saying what my supervisor wants me to say
      I F Boss gets mad because my letters are too long.

      100% = 0
      -1 = 2 students
      -2 = 6 students
      -3 = 2 students
      -4+ = 3 students

5. Circle the "C" or "U" to identify whether each of the following consequences are seen as certain (C) or uncertain (U) by an employee for the behavior described.

   a. Behavior: omitting typist's initials at the bottom of a letter.

      Consequences:

      C U Avoid being identified by others if my work is sloppy
      C U Avoid being caught if I've made errors in the letter
C U Lose opportunity to be rewarded for typing an error-free letter
C U My supervisor reprimands me.

b. Behavior: writing longer letters than necessary

Consequences:
C U Get to explain everything in detail
C U Takes me longer to write the letter
C U Have a better chance of saying what my supervisor wants me to say
C U Boss gets mad because my letters are too long.

100% = 0
-1 = 2 students
-2 = 4 students
-3 = 1 students
-4 = 6 (one did not attempt to answer this question, but did attempt the questions above).

6. Case study: ABC analysis exercise

Notes. Students did not complete this part of Chapter 4 response requests at the same rate as the rest of the chapter. Several students handed this particular section in on the last night of class. Overall response was very poor (all students received less than 50% of the answers correct). Tabulations were on attempts to complete, not accuracy, where 13 students attempted part (a) and 4 students attempted part (b). The next two exercises were taken directly from the workbook provided with Performance Management (Daniels, 1989):

Case A-2: Jonathan

Sally, an accounts-payable supervisor with a major government agency, is responsible for seeing that all invoices are processed and paid within fourteen days of receipt. She is extremely organized and
has been a very effective and efficient supervisor, achieving numerous “exceeds” on her evaluation because of her section’s timeliness in processing work.

Jonathan has been with the agency for ten years. Three months ago he was promoted into Sally’s section as an Accountant I. He appears eager to learn and processes his work within the three days he is allowed from receipt to distribution down the line.

In Sally’s opinion, Jonathan’s work is unorganized and sloppy, and he makes far too many errors. On four occasions within the last two weeks, Sally has gone to Jonathan’s office to locate specific invoices, only to become extremely frustrated because of the piles of paper stacked on his desk and around the floor. She talked to him once, commenting that if he cleaned up his mess, she’d be able to find things and he probably wouldn’t make as many errors.

Identify the labels used to describe Jonathan’s performance.

   a. unorganized
   b. sloppy
   c. messy
   d. eager to learn

Identify Jonathan’s key undesired and desired behaviors.

**Desired**

   a. turning in error-free work
   b. stacking papers on the shelf
   c. finding any invoice within 2 minutes

**Undesired**

   a. making too many errors
   b. stacking papers on the floor
   c. finding any invoice after 2 minutes

Restate the following behaviors so that they are more specific.

a. Jonathan making too many errors.

   Jonathan makes errors in 20% of his total work processed.

b. Jonathan not making too many errors.

   Jonathan makes errors at the rate of less than 2% of total work processed.
Complete the following ABC analysis

Performer(s): ____________________________

Analysis done by: _________________________

<table>
<thead>
<tr>
<th>THE PROBLEM PINPOINTED PERFORMANCE</th>
<th>ANTECEDENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Problem</td>
<td>inadequately trained</td>
<td>may get reprimanded</td>
</tr>
<tr>
<td>Pinpointed</td>
<td>supervisor interrupts</td>
<td>paid despite poor work</td>
</tr>
<tr>
<td>Performance</td>
<td>friends come in</td>
<td>supervisor gets mad</td>
</tr>
<tr>
<td>Jonathan making</td>
<td>Doesn’t care</td>
<td>Gets paid regardless</td>
</tr>
<tr>
<td>too many errors</td>
<td>frequent phone calls</td>
<td>supervisor does work</td>
</tr>
<tr>
<td>Restated as:</td>
<td>cannot be fired (career service)</td>
<td>may get negative eval</td>
</tr>
<tr>
<td>Jonathan’s errors</td>
<td>exceed 2% of work processed</td>
<td>they have to redo work</td>
</tr>
</tbody>
</table>

The Desired Pinpointed Performance

<table>
<thead>
<tr>
<th>Jonathan not making too many errors</th>
<th>training</th>
<th>supervisor praises me</th>
<th>P</th>
<th>F</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal interruptions</td>
<td>working slowly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Restated as:
Jonathan’s error rate is less than 2% of work processed

Antecedents and consequences which could be used for the Desired Pinpointed Performance

* Remember consequences are from the point of view of the performer(s).
7. There are seven steps in an ABC analysis; each is listed below. Place a number, 1-7, in front of each step to indicate the order in which the steps should be followed.

   ____ Complete an ABC analysis for correct performance. (a) Write the correct performance for the performer. (b) Complete as in Step 4. (answer: Step 5)

   ____ Describe the performance you don’t want and who is doing it (the problem). (Step 1)

   ____ The Solution: Add “Positives/Immediates” and antecedents for the correct performance. (Step 7)

   ____ The Diagnosis: Summarize the antecedents and consequences which are presently occurring. (Step 6)

   ____ Determine the severity of the problem. If the problem occurs frequently, complete Steps 4-7. (Step 3)

   ____ Describe what this person should be doing (correct or desired performance). (Step 2)

   ____ Complete an ABC analysis for the problem performance. (a) Write person’s name and problem performance on form. (b) List all possible antecedents and consequences. (c) Cross out any consequence not relevant to the performer. (d) Indicate whether each remaining consequence is P/N, I/F, C/U. (Step 4)

   100% = 11 students

   4> = 2 students

Note. Is this question asking for a response at a high level of cognitive involvement? What is the student trying to master at this point?
Chapter 5 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term below to its corresponding definition by placing a letter of the definition in front of the appropriate term.

   - Reinfocer (i)
   - Secondary reinforcer (e)
   - Social reinforcer (b)
   - Reinforcer surveys (d)
   - Work-related reinforcer (f)
   - Primary reinforcer (g)
   - Premack Principle (a)
   - WHIP (h)
   - Tangible reinforcers (c)
   - Reward (j)

a. “A method for identifying reinforcers which states that a high probability behavior (one that occurs predictably in a choice situation) may serve as a positive reinforcer for a low probability behavior (one that occurs at a low or zero rate).” (p. 241 and 62)

b. “Reinforcers that involve interaction between people. They may be verbal, written, or physical.” (p. 242 and 65)

c. “An object or activity that increases a behavior when presented following that behavior.” (p. 243 and 67)

d. “A form used to identify a wide range of a person’s possible interests.” (p. 58)

e. “Neutral stimuli that have been paired with primary reinforcers or other established reinforcers to the extent that they take on reinforcing characteristics.” (p. 242 and 56)

f. “Reinforcer between people at work which increase behavior or performance.” (p. 68)
g. "A positive reinforcer that is biologically important, such as food, water, warmth and sexual stimulation." (p. 241 and 56)

h. "An acronym for the rules of identifying and delivering reinforcement effectively." (p. 242 and 63)

i. "A consequence that increases the probability of a behavior occurring in the future." (p. 242 and 53)

j. "A consequence usually given for some outstanding accomplishment." (p. 242)

100% = 12 students
-2 = 1 student

2. Effective reinforcers share these characteristics:

   (a) they are readily available (What you Have In your Possession = WHIP)

   (b) they can be used frequently

   (c) they are cost effective

   (d) they are controllable.

Below indicate which reinforcers listed violate the guidelines for effective reinforcers by indicating on the line provided which characteristic was or might be violated (a, b, c or d above). Note: these reinforcers might be effective and you might not detect a violation.

_______ a. Money. (A & C)

_______ b. Mark offered his operators jackets if they solved a complex and long-standing quality problem. To his surprise and delight, they solved it in a fraction of the time he thought they would. However, several of the operators were upset that the jackets had not come in when they completed the assignment. (A)

_______ c. A sales director told his staff that they would each receive a raise if they reached the established sales quota. Two of the sales people did reach that quota, but received no more of a raise than their co-workers. The sales director admitted that while two sales
people did increase their sales rates, the company did not make enough of a profit to allow raises for anyone. (A & D)

_______ d. If you eat your asparagus, you can have some ice cream. (probably okay, but could violate B)

_______ e. Zelma noticed that a graphics artist would often get involved in projects other than those that were assigned to him. She decided to let him work on those tasks when he completed specified assignments. (no violation)

_______ f. Thomas tried to improve behavior at work by using a social reinforcer -- recognition in front of peers. Whenever an employee met a project deadline, he mentioned the employee's name and accomplishment at staff meetings. The employees loved it and deadlines were met at an increasing rate. Soon, however, the employees began to squirm at staff meetings, as Thomas read an ever-growing list of names at each meeting. The rate of meeting deadlines started to fall off. (B)

100% = 0

-3 = 6 students

-4> = 7 students

3. Identify the reinforcers below as "S" for social reinforcers, "W" for work related reinforcers, "T" for tangible reinforcers, and "G" for generalized reinforcers. Note: some reinforcers may have more than one letter.

_______ Money (W, T, G)

_______ Any interaction between people that increases behavior or performance. This interaction may be written, verbal or physical. (S, W)

_______ Food (T)

_______ The teacher always (or appears to) calls on the people on the front row to answer questions. Many people learn to sit in the back row. This is an example of negative reinforcement.
An object or activity that increases a behavior when presented following that behavior. (S)
Includes such things as money, food, privileges, other activities and material items.
(T, W)

When Susie completes her daily tasks at home (making her bed, putting her toys away...), she
receives a gold star (one for each task). At the end of the week, her stars are counted
and she can apply those stars towards a "reward" of her choice (15 stars = going to a
movie; 5 stars watch 1 hour of TV; 20 stars going to her cousin’s house to stay
overnight...). (T, G)

"You have done a nice job, I’m proud of you.” (S, W)

Hugs. (S)

Employee of the week. (S, W)

Frequent Flyer program. (T, W)

100% = 0 and -5> = 13 students

4. Identify the reinforcers below as "P" for primary reinforcers and "S" for secondary reinforcers.

Money (S)

Food (P)

Recognition (S)

Making things work (S)

Listening to music (S)

Neutral stimuli that did not have biological importance but were paired with other
primary or established secondary reinforcers. (S)

A reinforcer that is biologically important such as food, water, warmth and sexual
stimulation. (P)

100% = 10 students

-1 = 2 students

-2 = 1 student
Chapter 6 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term below to its corresponding definition by placing a letter of the definition in front of the appropriate term.

_____ 4:1 Rule (a)
_____ Sandwich method (b)
_____ Reinforcement log (c)
_____ "No-But" Rule (d)
_____ Shaping (e)
_____ Satiation (f)
_____ SSIP Model (g)
_____ Competitive benchmarking (h)
_____ Reward (i)
_____ Reinforcement system (j)

a. "A rule describing a minimum balance between the number of positive reinforcers and punishers that one gives over a period of time.” (p. 241 and 79)

b. "An ineffective method of correcting behavior, in which a positive comment or evaluation is followed by criticism which is in turn followed by another positive comment.” (p. 242 and 82)

c. "A form that enables people to note pertinent information about the reinforcers they give.” (p. 241 and 80)

d. "Positive responses given to employees by managers that are followed by conditional terms such as ‘but’, ‘if’, ‘however’, etc.” (p. 82)

e. "A procedure that involves the reinforcement of successive approximations toward some behavioral objective or goal.” (p. 242 and 90)

f. "A condition created when a reinforcer loses its effectiveness because of over use.” (p. 242 and 90)
g. "An acronym for the rules of identifying and delivering reinforcement effectively." (p. 242 and 93)

h. "A method of setting goals that avoids the problem of internal competition. It involves finding the performance level of your competitors and setting goals toward widening or closing the gap between your performance and your competition." (p. 238 and 89)

i. "A consequence usually given for some outstanding accomplishment." (p. 242 and 90)

j. "A system that ensures the effective delivery of reinforcement to all employees and does not rely solely on the manager to deliver it." (p. 84)

100% = 13 students

2. The guidelines for effective delivery of reinforcement include:

   a) personalize your reinforcement
   b) reinforce immediately
   c) make your reinforcement specific
   d) make your reinforcement sincere
   e) reinforce frequently
   f) don’t reinforce and punish at the same time
   g) don’t mix goal setting and reinforcement.

Below, indicated which guideline was violated, if any, in the reinforcers listed. Note: more than one violation may occur with any specific reinforcer.

- A salary (B and C)
- “Laying it on too thick.” (D)
- The “no-but” rule (F)
- The 4:1 rule (none)
- Sandwich method (F)
- Sally likes to praise her employees, but a survey of the employees indicated that they don’t feel praised very often by her. Sally often says, “You’re doing a good job.” (C)
"Jack, you have sold your quota of widgets this week. Now next week we want to see a 10% increase!" (G)

Richard thinks that he is just too busy to reinforce all of his employees effectively. (E)

The cartoon in Daniels' text on page 79. (A and C)

"Pat, we believe you have been a loyal and effective employee these past 20 years." (A)

A reinforcement system. (none)

100% = 0

-3 = 1 student

-4 = 2 students

-5> = 10 students

3. The SSIP Model is an acronym for effective delivery of reinforcers. Identify the guidelines the SSIP Model represents from the list below (check the appropriate answers).

☐ readily available

☐ be systematic

☐ be specific (X)

☐ use frequently

☐ separate reinforcers from goal setting

☐ personalized (X)

☐ don't punish at the same time you reinforce

☐ reinforce immediately (X)

☐ cost effective

☐ be sincere (X)

100% = 9 students

-1 = 1 student

-3 = 1 student

-4 = 1 student

-5 = 1 student where marking a wrong answer and failing to mark a correct answer is wrong.

4. Select the pitfalls or problems encountered in delivering reinforcement (usually by ignoring one of the guidelines for effective delivery of reinforcers).

☐ Not using a variety of reinforcers (allowing satiation). (X)
5. Contests can be an effective reinforcement program. Indicate below the conditions that match the author's guidelines for effective contests.

☐ The contest for reducing typing errors was held every week for one month. (X)

☐ Each data processing employee with fewer than three typing errors per day was allowed to go home an hour early on Friday that week. (X)

☐ The data processing employees were allowed to select their preferred reinforcer, and going home early on Friday was the unanimous decision. All of the data processing employees were excited to begin the contest. (X)

☐ At the end of the month, a new contest was started, but the vice president chose the reinforcer. He decided that the top three data processing employees (determined by
counting the number of days with one or no errors) would win the prize -- a company jacket.

☐ Since errors rose, another new contest was started the following month. The vice president allowed the employees to pick the reinforcer (they chose recognition on the company bulletin board). The top three percent of data processing employees (those with the fewest errors each day) were listed on the bulletin board.

100% = 3 students

-1 = 8 students

-2 = 1 student

-3 = 1 student
Chapter 7 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term below to its corresponding definition by placing a letter of the definition in front of the appropriate term.

   ____ Variable interval schedule (i)
   ____ Intermittent schedule of reinforcement (b)
   ____ Interval schedule (d)
   ____ Continuous schedule of reinforcement (a)
   ____ Post reinforcement pause (e)
   ____ Fixed ratio (f)
   ____ Ratio schedule (c)
   ____ Fixed interval schedule (h)
   ____ Variable ratio schedule (g)

a. "A schedule of reinforcement in which every occurrence of the behavior is reinforced.” (p. 238 and 95)

b. "A schedule of reinforcement where not every occurrence of the behavior of interest is reinforced.” (p. 239 and 95)

c. "A schedule based on the number of responses, or the amount of work accomplished.” (p. 99)

d. "A schedule wherein a period of time must pass before a response will be reinforced.” (p. 99)

e. "The characteristic break in responding following reinforcement on a fixed ratio schedule of reinforcement.” (p. 241 and 105)

f. "A schedule of reinforcement on which a response is reinforced only after it has been emitted a certain number of times. It describes the number of unreinforced to reinforced responses.” (p. 239 and 104)
g. "A intermittent schedule of reinforcement on which the number of responses or amount of performance required for reinforcement varies." (p. 243 and 105)

h. "An intermittent schedule of reinforcement on which an established amount of time must pass before the behavior of interest is reinforced." (p. 239 and 99)

i. "An intermittent schedule of reinforcement on which the time between opportunities for reinforcement vary." (p. 239 and 101)

100% = 10 students

-2 = 1 student

-3 = 1 student

2. Identify the schedules of reinforcement below as FR (fixed ratio), FI (fixed interval), VR (variable ratio), or VI (variable interval).

_____ Reinforcement is a surprise (the amount of responses vary). (VR)

_____ "A certain amount of time must pass before a given behavior or performance will be reinforced. Some period of time must go by before reinforcement is delivered; and at the end of this period, the desired performance must occur." (p. 99) (FI)

_____ Times between reinforcement vary. (VI)

_____ "A set number of responses...must be made before reinforcement is received." (p. 104) (FR)

_____ Who is more productive, a person on a fixed interval or fixed ratio schedule? (FR)

_____ Which schedule of reinforcement is easiest to administer? (FI)

_____ A schedule where every occurrence of the behavior is reinforced. (FR -- also continuous)

100% = 8 students

-1 = 1 student

-2 = 2 students

-3 = 1 student
3. Assuming the amount of reinforcement is the same, rank the following in the order in which they produce the highest response. (p. 104)

   ______  Fl (fixed interval schedule)  4
   ______  Fr (fixed ratio schedule)  2
   ______  VI (variable interval schedule)  3
   ______  VR (variable ratio schedule)  1

100% = 5 students
-2 = 6 students
-3 = 1 student

4. Which reinforcement schedule would you apply in the following situations: FI, FR, VI, or VR?

   ______  If you want something delivered only at a certain time. (FI)
   ______  If you want someone to stay alert and watchful. (VI)
   ______  If you want someone to complete each step of a task in its sequence. (FR)
   ______  If you want someone to be creative when performing a task. (VR)

100% = 10 students
-1 = 1 student
-2 = 1 student
5. Complete the chart below by writing FI, FR, VI, or VR in the appropriate spaces. (p. 100)

<table>
<thead>
<tr>
<th>Four Basic Schedules of Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interval</strong></td>
</tr>
<tr>
<td>R+ delivered when response is made after some time has passed</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Ratio</strong></td>
</tr>
<tr>
<td>R+ delivered after number of responses are made</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

100% = 11 students

-4 = 1 student

6. Circle the appropriate letter to indicate the four advantages to intermittent reinforcement.

Intermittent reinforcement...

a. ...can maintain performance. (circle)
b. ...avoids the problem of satiation. (circle)
c. ...helps a manager be more specific.
d. ...explains why some people seem to perform without reinforcement. (circle)
e. ...helps the behavior decrease over a long period of time.
f. ...frees managers to reinforce many different behaviors and performances. (circle)

100% = 12 students
Chapter 8 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term below to its corresponding definition by placing a letter of the definition in front of the appropriate term.

   _____ resurgence (a)
   _____ thinning (b)
   _____ ratio strain (c)
   _____ fixed time (d)
   _____ variable time (e)
   _____ extinction (f)
   _____ extinction burst (g)

   a. “The reappearance of a previously extinguished behavior.” (p. 242 and 111)
   b. “Changing the schedule of reinforcement so that reinforcement is provided less often.” (p. 243 and 112)
   c. “A disruption in high rates of performance caused by too little reinforcement or by making large changes in the size of the ratio.” (p. 241 and 113)
   d. “A schedule of reinforcement on which reinforcement is delivered at the end of a specified time whether or not the response has occurred. In other words, reinforcement is not contingent on any performance.” (p. 239 and 114)
   e. “A schedule of reinforcement on which reinforcement is delivered at varying times with no response requirement. As in fixed time, reinforcement is said to be non-contingent.” (p. 243 and 114)
   f. “A withholding, on non-delivery, of positive reinforcement for previously reinforced behavior. Extinction decreases performance. One of the four behavioral consequences.” (p. 239)
   g. “A sudden, often dramatic increase in behavior that usually occurs soon after extinction begins.” (p. 239)

100% = 12 students
2. Identify the four consequences following extinction by properly labeling the situations described below. Use "a" to indicate extinction bursts, "b" to indicate negative emotional behavior, "c" to indicate performance decrease, and "d" to indicate resurgence.

____ Temper tantrums increase when parents begin to ignore this behavior. (a)

____ In high school, Gene would often make faces at the teacher when he turned his back. On some occasions, Gene's classmates would howl with laughter. When he went off to college, no one laughed when Gene made faces behind the teacher. What will happen to Gene's face-making behavior? (c)

____ Rose told her boyfriend it's over between them. Since she did, he won't leave her alone. He calls constantly and comes to see her at work and at home unannounced. She's ignoring him, but his behavior is getting worse. What's happening? (a)

____ Bubba has asked to leave early several times in the last month because of some social commitment he made. The other day when he asked, the boss told him he could not go. He reacted by throwing a report on the floor and slamming the door to the boss's office. What is happening? (b)

____ Things have to get worse before they get better. (a)

____ If goals are set too high, what happens? (c)

____ Kristi often fails to put her bike away, so her father did it instead. He learns to use extinction and Kristi begins putting the bike away. Months later, however, she leaves her bike out again. (d)

100% = 3 students
-1 = 5 students
-2 = 1 student
-3 = 3 students
3. What is the reinforcement schedule described by the following situations? Indicate “FI” for fixed interval, “VI” for variable interval, “FR” for fixed ratio, “VR” for variable ratio, “VT” for variable time, and “FT” for fixed time.

_____ Jobs where patience and vigilance are more important than speed. (VI)

_____ A supervisor established a schedule where she verbally reinforces an employee every time he arrives at work on time. (FR)

_____ For every hotel room “sold” by a hotel sales manager, the employee receives a $1 bonus. (FR)

_____ At another hotel, sales managers earn a bonus at the end of the month, if they exceed their quota of hotel rooms. (FI)

_____ Throughout the semester, your teacher gives pop quizzes. Students who get 100% leave class early, all others remain in class for a review (which usually takes an hour). (VI)

_____ A manager is trying to help a cookie factory employee stay focused on the task of “making boxes” (cardboard boxes are flat, the worker folds the flaps correctly and tapes the bottom flaps in the closed position, leaving the top flaps upright). This worker has been known to take unauthorized breaks and visit other workers throughout the factory. So, the manager “catches” the worker making boxes, during unscheduled visits. The behavior of making boxes increases. The manager’s attention to this worker varies in length, but the attention is devoted just to that worker. The manager has been taught not to use the sandwich method and not to violate the “no-but” rule. (VI)

_____ Once a month, the director of a small association takes all employees out to lunch. The time varies according to the director’s schedule. This reinforcement is non-contingent. (VT)

100% = 1 student
-1 = 1 student
-2 = 1 student
-3 = 5 students
-4> = 4 students
Chapter 9 Response Requests (with answers, tabulated student responses, and notes)

1. Match each term below to its corresponding definition.

   ______ resurgence (c)
   ______ differential reinforcement of alternative behaviors (DRA) (b)
   ______ punishment (c)
   ______ differential reinforcement of low rates (DRL) (f)
   ______ correcting (a)
   ______ extinction (d)

   a. “A technique for dealing with unwanted or incorrect performance. It involves providing an unpleasant consequence (punishment) for any instance of unwanted performance and positive reinforcement for the desired or correct performance.” (p. 238 and 118)

   b. “A technique for dealing with unwanted performance; involves removing an existing pleasant consequence for any instance of unwanted performance (extinction) and positively reinforcing the desired performance.” (p. 238 and 118)

   c. A procedure in which a consequence is presented following some behavior or performance, having the effect of decreasing the frequency of the behavior or performance it follows. (p. 241)

   d. “A withholding, or non-delivery, of positive reinforcement for previously reinforced behavior. Decreases performance. One of the four behavioral consequences.” (p. 239)

   e. “The reappearance of a previously extinguished behavior.” (p. 242)

   f. “A behavior is reinforced only if the frequency falls below a criterion level for a specified period of time. Often used when the behavior is appropriate but its frequency is too high. Example: disrupting a meeting by telling a joke may be appropriate to put people at ease or break the tension. However, if it happens every five minutes or during every presentation, it would be a problem.” (P. 238 and 128)

100% = 9 students; -2 = 2 students; -4 = 1 student
2. Identify the situations below by labeling them “C” for correcting, “DRA” for differential reinforcement of alternative behaviors, or “DRL” for differential reinforcement for low rates. Note: use the chart on page 129 to help you decide.

_____ In a weekly staff meeting, Mr. Grench always complains about too much work; his boss does not respond to his complaining, but has started changing the subject and listening attentively when Mr. Grench talks about attempts to increase productivity in his work area. What procedure is his using? (DRA)

_____ What technique are you using when you punish an undesirable behavior and R+ a desirable one? (C)

_____ The ultimate reason for using punishment is to set up or create the opportunity for positive reinforcement. This is a technique called what? (C)

_____ What technique are you using when you ignore the undesirable behavior and R+ the desirable one? (DRA)

_____ You don’t mind when Sam calls his family once or even twice a day to check in with them, but he has been making several calls each day lasting for 20 minutes or more. You are trying to decrease the number of calls and the length of calls he makes to his family. What technique should you use? (DRL)

_____ When the performance is unhealthy, physically dangerous, or life-threatening to the performer or to others, which technique works most effectively? (C)

_____ When someone is doing things that are destructive to the organization, such as being dishonest or unfair, which technique works most effectively? (C)

_____ When you catch someone in the act of some undesired performance, which technique works most effectively? (C)

_____ Efrim constantly complains to his boss about job assignments. Should the boss use correcting or DRA to solve the problem? (DRA)

_____ When Tornado Jones’ scrap rate was above 5%, his boss Mr. Wasteless required him to do a detailed report that took several hours to complete; but then, when he showed improvement, Mr.
Wasteless wrote Jones a note congratulating him on his improvement. What procedure was Mr. Wasteless using? (C)

_____ Rafael tells off color jokes which make him popular with a lot of the guys who work near him in the boiler plant, but their being distracted has caused some near-accidents. Which procedure should you use to get Rafael to stop? (C)

100% = 1 student
-1 = 4 students
-2 = 1 student
-3 = 3 students
-5 = 3 students where 11 correct answers are possible.

3. See the list on page 123, "Guidelines for Correcting." Which situations below are in violation of these guidelines (circle the appropriate letter).

   a. Mike has been drinking wine coolers at lunch in the staff break room although alcohol on the premises is strictly forbidden (for safety reasons, as well as legal). You've been keeping track of these occurrences so you can have him fired -- to serve as an example for other employees. (circle)

   b. Employees have been leaving the doors to your restaurant unlocked when they leave for the night. Your restaurant was vandalized once already. When employees don't lock up, you dock their pay (employees are paid every 2 weeks), but you've decided that punisher isn't working well. You are going to raise the "fine". (circle)

   c. When you hold staff meetings, you use the time to gently expose employees to their mistakes, hoping that the comments will teach all employees how to avoid the same errors. (circle)

   d. Mark supervises a team of graphic artists who are allowed to keep irregular hours, as long as they meet deadlines. Failing to meet a deadline means regular hours must be observed by the entire team until the project is completed.

100% = 5 students
-1 = 3 students
-2 = 2 students
-3 = 1 student
-4 = 1 student where circling a wrong answer and failing to circle a correct answer is wrong.

4. The guidelines for differential reinforcement of alternative behaviors appears on page 132. Which situations below appear to be observing these guidelines? (Circle the appropriate letter.)

   a. Sally has a habit of laughing so loudly, people near her look at her in annoyance. You’ve decided to use DRA to manipulate her behavior change, but you don’t want to hurt her feelings. You decide not to tell Sally what you’re doing.

   b. One of your mechanics has been using some vulgar language at work, upsetting customers. You’ve decided to use the DRA technique and have carefully selected reinforcers for the desired behavior and a punisher for the undesired behavior. (Circle)

   c. Ryan is late to work nearly every day, a problem you want to change. You are going to explain to Ryan tomorrow why you want to eliminate his tardiness and you’re prepared for an emotional response. (Circle)

100% = 2 students
-1 = 6 students
-1 = 1 student
-3 = 3 students

5. Punishment has negative side effects, which make this consequence less desirable than positive reinforcement. But punishment can be an acceptable behavior consequence in the workplace. Which of the situations below are likely to result from the use of punishment (circle the appropriate letter)?

   a. Unwanted behavior increases steadily.

   b. Aggressive behaviors may increase. (circle)

   c. Escape and avoidance behavior may increase. (circle)
d. A marketing director prepared detailed marketing plans for the marketing committee for each product -- these plans were well written and designed. However, the director lacked good presentation skills and was often criticized publicly by committee members for her presentation style. Eventually, she quit making long presentations and began to leave details out of her marketing plans, as well. She was fired months later for being ineffective. (circle)

100% = 7 students

-1 = 4 students

-3 = 1 student
Chapter 10 Response Requests (with answers, tabulated student responses, and notes)

1. Match the two terms below to the appropriate definitions.

   ____ reliability (a)
   ____ Dead Man's Test (d)
   ____ pinpoint (b)
   ____ result (c)
   ____ performance (c)

   a. “Degree to which a measurement system remains consistent regardless of the conditions under which measurement takes place no matter who is measuring.” (p. 242 and 135)

   b. “A specific description of performance that refers to any action (behavior) of a person or any outcome (result) he produces.” (p. 240 and 135)

   c. “A pinpoint that refers to an outcome or product of behavior.” (p. 242 and 140)

   d. A test to determine if a pinpoint is stated in active terms.” (p. 238 and 140)

   e. “A number, or series, of behaviors directed toward some goal.” (p. 240)

   100% = 13 students

2. Using Figure 10.3 on page 142 in your text, identify whether the following are results or behaviors by putting “B” by each behavior and “R” by each result.

   ____ sharpening tools (B)    ____ errors made (Re)
   ____ sales calls made (Re)    ____ sneering (B)
   ____ mail delivered correctly (Re)    ____ washing dishes (B)
   ____ phone calls dialed correctly (Re)    ____ meetings attended (Re)
   ____ answering phone (B)    ____ filing (B)
   ____ number of files filed correctly (Re)    ____ tools sharpened (Re)
   ____ reports handed in (Re)    ____ leaving desk (B)
100% = 13 students

3. Are the following situations under the control of the performer?

Example:

| No | Fiscal Assistant | Purchase orders received that are incorrectly filled out |

Yes or

| No | Performer | Situation |

| _____ | Waitress | Number of diners assigned to her table(s) (no) |
| _____ | Data Entry Operator | Computer system breaking down (no) |
| _____ | Typist | Number of typing errors made (yes) |
| _____ | Architect | Specifications written correctly (yes) |
| _____ | Professor | Being on time to class (yes) |
| _____ | Teacher | Students not attending class (no) |
| _____ | Telephone Operator | Being rude to callers (yes) |
| _____ | Clerk | Not receiving deed in time to record that day (no) |
| _____ | Cafeteria Server | Food arriving too late to be served to students (no) |

100% = 9 students

-1 = 2 students

-2 = 2 students

4. Using the checklist on page 142 (Figure 10.4), evaluate the pinpoints listed below.

Sam types letters and envelopes for the company. We want to increase the number of error-free letters and envelopes he produces each day.

Yes or No List of questions
1. Is it a result? (Yes)

2. Is it a behavior? (Yes)

3. Is it measurable? (Yes)

4. Is it observable? (Yes)

5. Can two independent counts agree? (Yes)

6. Is it under the performer's control? (Yes)

7. Is it an active performance? (Yes)

100% = 9 students

-2 = 4 students

Mark has a nasty disposition and we want to decrease the number of times he displays this attitude in the office.

<table>
<thead>
<tr>
<th>Yes or No</th>
<th>List of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Is it a result? (Yes)</td>
</tr>
<tr>
<td></td>
<td>2. Is it a behavior? (No)</td>
</tr>
<tr>
<td></td>
<td>3. Is it measurable? (No)</td>
</tr>
<tr>
<td></td>
<td>4. Is it observable? (No)</td>
</tr>
<tr>
<td></td>
<td>5. Can two independent counts agree? (No)</td>
</tr>
<tr>
<td></td>
<td>6. Is it under the performer's control? (Yes)</td>
</tr>
<tr>
<td></td>
<td>7. Is it an active performance? (No)</td>
</tr>
</tbody>
</table>

100% = 13 students

Gretchen washes dishes at a restaurant. Some of the dishes are not clean when she is done with this task and she breaks too many dishes. We want her to increase the number of dishes washed clean, without increasing the numbers of dirty dishes or broken dishes.

<table>
<thead>
<tr>
<th>Yes or No</th>
<th>List of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Is it a result? (Yes)</td>
</tr>
</tbody>
</table>
2. Is it a behavior? (Yes)
3. Is it measurable? (Yes)
4. Is it observable? (Yes)
5. Can two independent counts agree? (Yes)
6. Is it under the performer’s control? (Yes)
7. Is it an active performance? (Yes)

100% = 9 students
-2 = 4 students

Decrease the number of coffee breaks you take each day.

<table>
<thead>
<tr>
<th>Yes or No</th>
<th>List of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Is it a result? (Yes)</td>
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<tr>
<td></td>
<td>2. Is it a behavior? (No)</td>
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<tr>
<td></td>
<td>3. Is it measurable? (Yes)</td>
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<tr>
<td></td>
<td>4. Is it observable? (Yes)</td>
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<tr>
<td></td>
<td>5. Can two independent counts agree? (Yes)</td>
</tr>
<tr>
<td></td>
<td>6. Is it under the performer’s control? (Yes)</td>
</tr>
<tr>
<td></td>
<td>7. Is it an active performance? (No)</td>
</tr>
</tbody>
</table>

100% = 13 students
Chapter 11 Response Requests (with answers, tabulated student responses, and notes)

1. Match the terms with appropriate definitions.

   ______ point system (a)
   ______ counting (l)
   ______ measurement (b)
   ______ quality (c)
   ______ rate-opinion (d)
   ______ novelty (e)
   ______ rank-opinion (f)
   ______ rank pre-established criteria (h)
   ______ sampling (g)
   ______ class (i)
   ______ BARS (k)
   ______ judgment (i)

   a. “A way of combining the measures of many behaviors or performances into a single number or index of performance.” (p. 240 and 155)

   b. “The use of counts or judgments to answer questions relating to the quality, quantity, timeliness, or cost of a performance.” (p. 240 and 145)

   c. “A measurement category of the degree to which a product, service, or performance includes specified essential elements. Its measurements include the three subs-categories: accuracy, class, and novelty.” (p. 241 and 148)

   d. “A judgment measurement technique often used for measuring the class or novelty of a performance. Performance is scored on an opinion scale.” (p. 241 and 153)

   e. “A subcategory of the measurement of quality. Refers to performances that are important for their newness or creativity.” (p. 240 and 150)
f. "A judgment measurement technique often used for measuring the class or novelty of a performance. Groups or individuals are compared on the basis of someone's opinion." (p. 241 and 153)

g. "A way of collecting data on behavior where every instance of the behavior does not have to be counted. It involves counting behavior at random times and frequently enough to obtain a reliable estimate of the actual frequency." (p. 242 and 151)

h. "A judgment measurement technique used for measuring class or quality of a performance. The performance of a group or individual is ranked with others on specified criteria." (p. 241 and 153)

i. "A major measurement method involving subjective evaluations of performance." (p. 239 and 152)

j. "A subcategory of the measurement of quality. It involves the comparison of one performance to another on the basis of something other than accuracy or errors." (p. 238 and 150)

k. "A judgment measurement technique in which each number on the scale represents a specific set of observable behaviors." (p. 238 and 154)

l. "A measurement method involving recording the number of times a performance occurs or how much time it takes." (p. 238 and 151)

100% = 11 students
-2 = 2 students

2. When addressing the issue of "answering the telephone", which measurement technique (use "C" for counting and "J" for judging) would be most appropriate for each of the following:

_____ answering by the third ring (c)

_____ getting back to the caller on hold within 30 seconds (c)

_____ taking messages correctly (c)

_____ getting complete information (c)

_____ writing legible messages (c or j)

_____ talking only with the caller (not carrying on a second conversation—either verbal or non-verbal — with someone other than the caller) (c)
____ using a pleasant tone of voice (j)
____ providing creative solutions for problems (j)
____ talking directly into the mouthpiece (c or j)
____ having writing implement in hand (c)
____ wearing a smile (c)

100% = 0
-1 = 1 student
-2 = 7 students
-3 = 4 students
-4 = 1 student

3. In your text, Daniels talks about the four categories for measurement: quality (accuracy, class, novelty), quantity (frequency and rate), timeliness, and cost (labor, material, management). Analyze the job performance below by correctly identifying measures listed with the category they represent.

Example:

quality-accuracy

percentage of times fail to answer phone by third ring

<table>
<thead>
<tr>
<th>Measurement category</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>identifying the cost of equipment, message pads, etc.</td>
<td>(cost-mat)</td>
</tr>
<tr>
<td>number of calls answered per hour</td>
<td>(qn-rate)</td>
</tr>
<tr>
<td>number of calls answered by third ring</td>
<td>(qn-frequency)</td>
</tr>
<tr>
<td>delivering messages within a specific time period</td>
<td>(qn-timeliness)</td>
</tr>
<tr>
<td>translating into dollar value the cost of training and salaries</td>
<td>(cost-labor)</td>
</tr>
<tr>
<td>percentage of times use pleasant tone of voice when answering phone</td>
<td>(q-class)</td>
</tr>
<tr>
<td>number of messages recorded during a shift</td>
<td>(qn-freq)</td>
</tr>
<tr>
<td>identifying the cost associated with the time a supervisor or manager is involved</td>
<td>(cost - mgmt)</td>
</tr>
</tbody>
</table>
100% = 1 student
-1 = 1 student
-2 = 1 student
-3 = 5 students
-5> = 5 students

4. In your text, Daniels lists seven guidelines for effective point systems. Using those guidelines, evaluate the point system provided on page 158.

<table>
<thead>
<tr>
<th>Yes or No</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Is the system focused on R+?</td>
</tr>
<tr>
<td></td>
<td>2. Does the system show small improvements?</td>
</tr>
<tr>
<td></td>
<td>3. Does the system focus on desired behavior?</td>
</tr>
<tr>
<td></td>
<td>4. Does the system lead to a total score?</td>
</tr>
<tr>
<td></td>
<td>5. Does the system use rating?</td>
</tr>
<tr>
<td></td>
<td>If yes, does the system use BARS?</td>
</tr>
<tr>
<td></td>
<td>6. Does the system using simple accounting?</td>
</tr>
<tr>
<td></td>
<td>7. Is flexibility built into the system?</td>
</tr>
</tbody>
</table>

All questions should be answered yes, except for both options in question 5.

100% = 5 students
-2 = 4 students
-3 = 2 students
-4 = 1 student
-5> = 1 student
Chapter 12 Response Requests (with answers, tabulated student responses, and notes)

1. Match the terms with appropriate definitions.

   - mission (a)
   - ACORN (b)
   - reconcilable (c)
   - accomplishment (d)
   - control (e)
   - overall objective (f)
   - numbers (g)
   - validity (h)
   - reliability (i)
   - 80:20 Principle (j)

   a. “The single most important result (accomplishment) of a job, team, or organization.” (p. 240 and 167)


   c. “The part of the criterion test for evaluating a job mission that states ‘the accomplishment must have minimal conflict with the requirements of other jobs.’” (p. 170)

   d. “Part of the criterion test for evaluating a job mission that states, ‘it is a result, not a behavior.’” (p. 168)

   e. “The part of the criterion test for evaluating a job mission that states, ‘the performer has the predominant influence over the accomplishment.’” (p. 168)

   f. “A part of the criterion test for evaluating a job mission that states, ‘the accomplishment which represents the major reason for the job’s existence, not just one of several...’” (p. 169)

   g. “The part of the criterion test for evaluating a job mission that states, ‘it must be possible to generate practical, cost-effective data to measure the accomplishment.’” (p. 172)
h. "The extent to which a measure measures what is purported to be measured." (p. 243 and 172)

i. "Degree to which a measurement system remains consistent regardless of the conditions under which measurement takes place no matter who is measuring." (p. 242 and 172)

j. "Pareto's Law interpreted in PM to mean that 20 percent of employee behaviors probably produce 80 percent of the results." (p. 175)

100% = 13 students

2. Using the chart (Figure 12.4) on page 178, label "B" when the focus should be on behaviors and "R" when the focus should be on results in the situations listed below.

_____ A new employee does not type, but producing computer-generated documents is part of the job description. (B)

_____ A receptionist knows how to answer the phones appropriately, but often lets the phone ring more than 3 times before answering. (B)

_____ Door-to-door sales job. (Result)

_____ The number of hotel room-nights sold has decreased recently, primarily due to a significant recession in the nation (people simply aren't traveling as much as they were before the recession). (B)

100% = 3 students

-2 = 6 students

-3 = 3 students

-4 = 1 student

3. Using the ACORN test (see page 168) evaluate the job mission below.

Job: Hospital "Floor Supply Technician" or FST
Mission: Each patient care area is stocked (all rooms on several floors) with basic care supplies and, if the room is occupied, with patient-specific medications and supplies.

Description of job: The FST takes supplies from the general supply room, clearly adjusting the inventory control list so new supplies can be purchased as needed, and replenishes supplies in each patient care area. If the room is occupied, the FST checks the patient’s chart and stocks the patient care area with patient-specific medications or supplies. Medications are available only when the nurse-on-duty has ordered those medications from the pharmacy, the pharmacy has notified the FST that medications are ready for pickup, and the FST has duly noted receipt of medications on the nurse’s log.

<table>
<thead>
<tr>
<th>Yes or No</th>
<th>Acorn Test Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is this mission an Accomplishment?</td>
</tr>
<tr>
<td></td>
<td>Does the performer Control the result?</td>
</tr>
<tr>
<td></td>
<td>Is this mission the Overall objective of the position?</td>
</tr>
<tr>
<td></td>
<td>Is this mission Reconcilable with other jobs?</td>
</tr>
<tr>
<td></td>
<td>Can cost-effective, reliable, and valid Numbers be generated to measure the accomplishment?</td>
</tr>
</tbody>
</table>

All questions should be answered yes, although students may question the “Control” response.

100% = 8 students
-1 = 4 students
-4 = 1 student
Chapter 13 Response Requests (with answers, tabulated student responses, and notes)

1. Match the terms with appropriate definitions.

   ___ performance feedback (a)
   ___ S^0 (b)
   ___ information or data (d)
   ___ performance management (c)

   a. "Information about past performance people can use to change their performance." (p. 239 and 181)

   b. "An antecedent that has a history of being paired with positive reinforcement. In other words, a discriminative stimulus indicates a high probability that the behavior associated with it will be reinforced." (p. 239 and 185)

   c. "A systematic, data-oriented approach to managing people at work that relies on positive reinforcement as the major way to maximize performance." (p. 240)

   d. Characteristics of behavior detailed verbally or in writing that does not specify which behavior to change or relate to a goal. (p. 181)

100 % = 13 students

2. According to Daniels, performance feedback must relate the specific behavior to a goal and should tell you what to do to improve. The characteristics of effective performance feedback are listed on pages 185-191. Using this information, check the examples of performance feedback below which do not violate the guidelines presented in the text.

   □ Diet Center worked out an agreement with an employer to provide free nutrition counseling to employees (the employer pays the fee) as long as the employee shows improvement (weight reduction). The counselors help the employee set a goal, set daily logs of proper nutrition (a form the employee fills in identifying food consumed), and a daily graph showing weight loss. The counselor discusses the daily
log’s relationship to the graphed data with the employee during the daily check-in. When the graph indicates weight-loss, the counselor provides positive reinforcement (praise) and when the daily log indicates correct food consumed/incorrect food avoided, positive reinforcement is provided. (X)

☐ The sales person’s goal for the quarter is posted in the common meeting area. When a sale is made, the employee marks the accomplishment on the graph -- intermittently the progress is noted by other employees and the supervisor and social reinforcers are provided. (X)

☐ Since the graph appeared to be a waste of time, the supervisor, Sam, simply monitored the information about error-free products produced and kept his boss informed. At the end of the year, the department had the best rate of error-free products, so the department was given an unexpected Christmas bonus.

☐ Sheila decided she simply didn’t have time to monitor all of the housekeepers (15) at her hotel, so she decided to post the “team’s” progress of percentage of “cleaned” rooms that pass inspection each day. This chart is posted in the break room so all of the housekeepers can see how well the team is doing.

☐ John has trouble keeping employees honest about the tips they receive. The servers are supposed to put their tips in a common “bucket” to be divided equally among all employees, since they are so dependent upon each other for success. However, he suspects employees are putting about 25-50% of their tips in their pockets (not the bucket). He decided to graph the tips received by individuals (each employee marks a graph for their tips that day), and at the end of each week, he collects the graphs. The employee contributing the most tips receives social praise and a $20 gift. “Tips” begin to rise dramatically and all employees seem enthusiastic about the new system. (X)

100% = 2 students
-1 = 8 students
-2 = 2 students
-4 = 1 student
Chapter 14 Response Requests (with answers, tabulated student responses, and notes)

1. Match the following terms with appropriate definitions.

   ___ time-series graphs (e)
   ___ intervention (b)
   ___ y-axis (c)
   ___ x-axis (d)
   ___ baseline (a)
   ___ graph label (j)
   ___ A-B-A design (g)
   ___ A-B-A-B design (h)
   ___ multiple baseline design (i)
   ___ A-B design (f)

   a. “Data collected before a performance improvement effort that provides a comparison with the
      intervention data for the purpose of evaluating the effectiveness of your intervention.” (p. 237 and 195)
   b. “Usually refers to the process of applying performance management procedures to a problem
      or performance improvement opportunity.” (p. 239 and 195)
   c. “The axis indicating the measure of performance being graphed.” The vertical axis. (p. 194)
   d. “The axis indicating the time periods being measured.” The horizontal axis. (p. 194)
   e. “A graph that tracks the same variable over a period of time.” (p. 243 and 196)
   f. “A design wherein baseline data are collected, then an intervention is introduced.” (p. 199
      and 237)
   g. “An experimental design in which a baseline...is followed by an intervention ...which is
      subsequently withdrawn or stopped, creating a return to baseline conditions...” (p. 237 and 200)
   h. “The same as the ABA design but the intervention is started again following the positive
      reinforcement as the major way to maximize performance.” (p. 240 and 200)
i. “An experimental design in which the experimenter attempts to replicate the intervention effects across subjects, settings, or performance variables. The intervention is introduced to each subject, setting, or performance variable in a (staggered) sequence that allows the evaluation of the intervention against the baseline of succeeding interventions.” (p. 240 and 200).

j. “A concise but descriptive statement of the performance being graphed.” (p. 194)

100% = 13 students

2. Identify whether the following are positive (P) or negative (N) locations for posting group graphs (p. 197).

_____ breakrooms (P)
_____ entrances (P)
_____ conference rooms (N)
_____ work stations (P)
_____ the cafeteria (P)
_____ private offices (N)
_____ restrooms (P)
_____ near vending machines (P)
_____ hallways (N - if dark)

100% = 10 students
-1 = 1 student
-2 = 1 student
-4 = 1 student

3. True (T) or False (F)?

_____ Management should publicly display all graphs of individual performance. (p. 196) (F)
_____ Management should publicly display all graphs of group performance. (p. 196) (T)
_____ Line graphs are best used when graphing several variables at one point in time. (p. 196-197) (F)
Bar graphs are best used when graphing several variables at one point in time. (p. 196-197) (T)

Line graphs are the easiest to construct and the easiest to understand. (p 196-197) (T)

On a graph, the intervention data should be separated from the baseline data by an intervention line because otherwise it inaccurately gives the appearance of change before intervention. (p. 195) (T)

100% = 11 students
-1 = 1 student
-2 = 1 student

4. Graph -- Students were given specific information about two separate behaviors of a fictitious employee and were asked to graph the information including labels, data points, and intervention line.

(The exercise was taken from the companion workbook for Performance Management.)

100% = 1 student
-1 = 1 student
-2 = 2 students
-3 = 1 student
-4 = 5 students

-5> = 3 students where all the points shown are correct answers and partial answers are wrong.
Chapter 15 Response Requests (with answers, tabulated student responses, and notes)

1. Match the following terms with appropriate definitions.

   ___ behavior chain (a)
   ___ backward chaining (b)
   ___ shaping (c)
   ___ sub-goals (d)
   ___ goal (e)
   ___ goal setting (f)
   ___ forward chaining (g)
   ___ challenging goals (h)
   ___ attainable goals (i)
   ___ negatively accelerated learning curve (j)
   ___ positively accelerated learning curve (k)

a. “Two or more behaviors that lead to reinforcement...” (p. 209)

b. “Developing a chain of behaviors by starting with the last behavior in the chain, then proceeding to make a chain of the last two behaviors and continuing to lengthen the chain backwards to the first behavior in such a way that the complete sequence of behaviors can be performed reliably.” (p. 237 and 210).

c. “A procedure that involves the reinforcement of successive approximations towards some behavioral objective or goal. A very effective method for teaching new behaviors or improving low performance.” (p. 242 and 207)

d. “Goals along the way to some ultimate goal.” (p. 242 and 205)

e. “An antecedent that describes a specified level of performance to be attained. In PM it describes the level of performance needed to attain positive reinforcement.” (p. 239 and 205)

f. “A defining of a specified, or preset, level of performance to be attained...” (P. 205)
g. "A chain of behaviors developed by starting with the first behavior in the chain and proceeding to the next in the chain until the complete sequence of behaviors can be performed readily." (p. 239 and 210)

h. "Refers to how high a goal should be set; goals are set no higher than a person can reach before extinction sets in." (p. 206-207)

i. "Refers to how low a goal should be set; highly probably goals." (p. 206-207)

j. "A curve in which performance is rapid at the beginning but slows later." (p. 211)

k. "A curve in which performance progress is slowest in the beginning with more rapid improvement in the middle stages and slower progress in the final stage." Also known as an s-shaped curve. (p. 211)

100% = 13 students

2. Match the following pinpoints with appropriate goals.

   _____ Responder answers the phone using a pleasant tone. (c)

   _____ Telephone mouthpiece is positioned within one to one and one-half inches from the speaker's mouth. (b)

   _____ Employees completing work assignments as expected by supervisor. (h)

   _____ Supervisor and staff arguing with each other. (d)

   _____ Employees completing work assignments on time. (g)

   _____ Supervisor providing clear completion expectations for assignments. (f)

   _____ Supervisor providing clear directions for assignments. (e)

   _____ Telephone responder is seated when talking on the phone. (a)

a. ...is seated in chair nine of every ten calls received.

b. ...98% of the time spent talking on the phone.

c. ...a minimum of nine out of every ten calls.

d. ...less than 2 arguments occur over a four-week period.

e. ...supervisor itemizes each step required to complete each assignment.
f. supervisor states (1) task sub-goals deadline, (2) complete task date deadline, (3) time completion is due, (4) person to whom assignment should be given.

g. employee completes 98% of all assignments by pre-established deadline.

h. employees complete work assignments in accordance with specific steps as outlined by supervisor.

100% = 2 students

-2 = 7 students

-4 = 4 students

3. For the goals listed below, identify what source(s) of information could have been used to establish those goals. (Note, some goals may have been established using several sources of information.)

a. The characteristics of the performance (how people typically learn this behavior or change it).

b. The performer’s past history.

c. The performance of others.

d. Existing industry-engineered standards.

e. Participation by the performers

Receptionist is seated in chair nine of every ten calls received. (b, c, d, e)

Receptionist spends 98% of time talking on the phone. (b, c, d, e)

The receptionist uses a pleasant tone of voice nine out of every ten calls. (a, b, c, d, e)

The supervisor and staff argue less than 2 times over a four-week period. (b, c, e)

The supervisor itemizes each step required to complete each assignment. (a, b, c, e)

The supervisor states (1) task sub-goals deadline, (2) complete task date deadline, (3) time completion is due, (4) person to whom assignment should be given. (a, b, c, e)

The employee completes 98% of all assignments by pre-established deadline. (a, b, c, e)

Employees complete work assignments in accordance with specific steps as outlined by supervisor. (a, b, c, e)

100% = 11 students
-5> = 2 students where correct answers match the options noted and missing an option is wrong.

Note. Ideally, students would use these response requests as study guides for chapters. Correct answers and feedback would be offered in class. Additional examples/non-examples would be given in class during individual and/or group exercises. Test items would offer additional examples and non-examples. A determination would be made as to the value and clarity of each question, based on the number of correct answers students could achieve and the statements below, gathered in focus groups with graduate students who agreed to assess these questions for this study.

Students agreed that terms and definitions were appropriate, but that some of Daniels’ definitions are vague (particularly the definitions for positive and negative reinforcement).

Students liked page numbers with a preference for the text pages over the glossary pages in the definitions; although, they saw the value of “teaching” students to look for boldface types in the text to answer vocabulary questions.

Students preferred a well-developed text for this course (e.g., put graphs and figures on pages that define the terms, in reference to Markle’s points on graphic design; put boldface and definitions off to the side of the page as a sidebar; define words more clearly and use graphics to indicate definitions).

Response requests need to be written in such a way that answers can be clearly scored (e.g., did the student “complete” the assignment if they didn’t find all the possible correct answers on the graph?).

Students felt the response requests helped them perform at a higher standard on quizzes in this course, even more so than the study guides provided for this class. (Note: no quantitative data was gathered on this issue, as the point of this exercise was to develop response requests, not to evaluate student performance.)

Students wanted to know what the objectives were for this class (an overall goal, not educational objectives). What were they expected to be proficient in? If that can be identified, they would feel they gained more form the mateial (the consensus was that too much emphasis was placed on memorization, rather than the ability to transfer new knowledge or skills to unique situations).
Students felt they had to work harder to answer the response requests (in comparison to study guide questions and quizzes) and that they had to concentrate (process) the course content to complete the response requests.

Students felt they needed to be adequately compensated for working on response requests (the preferred level of compensation was not established in the focus group discussion).

Students stated that immediate feedback to their work on the response requests would have been better than waiting until the end of the class to get their papers returned with feedback.