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## SOFTWARE REVIEW

### Cliffs' GRE StudyWare Package: A Critical Evaluation

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This article evaluates Cliffs' GRE StudyWare package (Bobrow, 1992). In addition to focusing on software considerations, this evaluation discusses the educational implications of using Cliffs' approach. The author makes recommendations concerning Cliffs' method for Graduate Record Examination (GRE) preparation.

Students preparing for the Graduate Record Examination (GRE) may choose among a variety of products. Cliffs' GRE StudyWare program (Bobrow, 1992) for the Macintosh combines computer software, Cliffs' *GRE Preparation Guide* (Bobrow, Orton, & Covino, 1992) and *StudyWare Test Preparation Series User's Manual*. The software contains four practice tests that cover 30 areas. The Test section provides two complete exams. For the Exam section, the person is required to use the preparation guide to see the exam questions, graphs, and other necessary information. The computer provides an answer sheet and the results on completion. The Drill section contains practice sets in each of the three exam areas: verbal, mathematical, and analytical. Feedback is provided for drill sets and tests.

Performance scores or feedback is provided in three ways: Topic Priority Breakdown, Items Missed, and Results Graph. The Topic Priority Breakdown generates detailed feedback by indicating the percentage correct for each subsection of the exam. For instance, the Analytical section examines logical, spatial, membership, temporal, and cause and effect reasoning. This allows the test takers to focus on areas of weakness by selecting from the Drills menu the areas that require more practice. The Items Missed section lists the individual questions that were answered incorrectly. Another form of feedback, the Results Graph, depicts the percentage correct for each section of the test. Because the program does not provide print functions, this graph is a simulation of the one presented in the computer program. The graph option allows visual feedback about progress in the different sections of the exam.

The *GRE Preparation Guide* includes three full-length practice tests, answers with complete explanations, and review chapters for each area of the GRE Test. The *StudyWare Test Preparation Series User's Manual* provides instructions for installation, start-up, and introduction to the program. The manual discusses the pull-down menus, the system for using the program, and test options.

#### OVERALL EVALUATION

Evaluation criteria used for this review were compiled from the suggestions of a variety of researchers (Alesandrini, 1983; Brownell, 1987; Jolicoeur & Berger,

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1986; Lepper & Gurtner, 1989; Sternberg, 1988; Vargas, 1986). Depending on the type of product considered, other criteria may be necessary for evaluation. General considerations for this software package are cost, target group, coverage of GRE topics, and technical support. The GRE StudyWare package costs from \$30-\$50 for the program and the study guide. The package lists additional information about technical support. Although Cliffs does have a technical support department, this number can only be reached through information.

The software program and the support guide adequately cover the verbal, mathematical, and analytical sections for the GRE Test. The support guide includes information about the ability being tested, basic skills necessary, method for understanding directions, and suggested problem-solving strategies. The software and support guide provide many opportunities for practicing these skills. Also, concept development is clear and concise. The software program provides a unique learning experience (immediate feedback) that cannot be achieved using the traditional approaches for GRE preparation such as study guides. In addition, this package is appropriate for those individuals required to take the GRE in that it covers the areas presented on the test. On the other hand, the social-cultural relevance may be limited to those individuals who share common educational experiences in the United States culture.

The design of a software package is critical if it is to serve as a learning tool. Relevant responding, appropriate stimulus control, presentation of information, and trapping errors are just a few considerations for evaluating software. Vargas (1986) argued that approaches that stimulate a high rate of student responding produce high achievement as compared with approaches that allow minimal student response. The GRE StudyWare program provides a high rate of user response. It has often been proposed that interest and motivation are increased by computer-assisted learning because the process involves learning under the control of the user (Lepper, 1985; Malone, 1981; Papert, 1980). All reading passages and diagrams are relevant to answering questions, and the user is not presented with unnecessary, distracting information. Not only are verbal messages used to gain attention, but the program also provides the option of sound to cue the user. The program also allows users to stop the program, save work, and continue at a later time.

For learning to be effective, students must make relevant responses to appropriate stimuli. It would be very easy for a person to type in a correct answer without knowing why the answer was correct. In the tutor mode, the person is given an explanation for the answer even if the question was answered correctly. In addition, the informative feedback is displayed along with the question. Inappropriate cuing refers to giving away answers by using terms highlighted in text and then using these terms in the answers. The GRE package avoids inappropriate cuing, which helps the student rely more on critical thinking skills to solve problems. Although the program informs the learner what type of response is required, help screens are available.

Another important part of any software package is the manner of presentation. The software program and study guide are free of grammatical, spelling, and punctuation errors. Presentation on the computer was clear: One question appeared on the screen at any given time. To read a text or a diagram, the user is required to select "See Graph/Text" from the menu options. The diagram then appears on the screen. To see the question, the user presses the space bar. This is where the program is at a disadvantage compared with traditional approaches in which the diagram and question appear on the same page. Flipping back and forth may be necessary, but also distracting.

ment. High user control, immediate feedback, and privacy help to empower the user. One of the implications of using a package like this is the potential for empowerment.

## RECOMMENDATION

The study guide is quite clear and complete in its approach. It follows the study guide checklist presented at the beginning of the book. Even though the program gracefully traps errors, it would be helpful to include a section on how to prevent possible errors. More important, the documentation should include a help line or a number to call if there are questions or problems with the software. The publisher should provide information about software development, theoretical foundations, and the research evidence that generated its creation.

Software evaluations must also consider a variety of instructional design features such as clear objectives, appropriate content coverage, variety in problem-solving approaches, activating prior knowledge, and the promotion of transfer. Specifying objectives serves to guide learning. In the study guide, each section of the test contains a list of main objectives for which the person has a choice of topics. The primary purpose of these sections is to activate prior knowledge. The GRT package is successful in this respect because it allows the user to test for necessary prior knowledge. If the user is lacking in an area, drill exercises are available to provide additional practice. With the drills and tests included in both the software and the study guide, there are many opportunities for assessment. The package guides learning by providing a variety of methods to solve problems. Alesandri (1983) stressed that giving learners both verbal and visual analogies helps them make the integration of new information in light of prior knowledge.

The issue of transfer is critical when considering a software package. Especially because the person's scores will be dependent on the method of study, the issue of transfer must be addressed. Recently, the GRT has been administered by computer (Educational Testing Service, 1992). Although this would represent a similar context compared with Cliffs' approach, researchers have not investigated the issue of transfer with respect to this product. Although this information is not available, this product can be critiqued on how well it promotes transfer. The study guide has excellent summaries of lessons and explanations of their importance. The examples in the study guide provide a familiar context for the user. Although the user has many opportunities to apply information to new situations, few instances are provided of application beyond the information covered in the lesson. Furthermore, the program fails to provide the additional references; therefore, this package's approach to promoting transfer is moderate. Further evidence is needed to determine the type of transfer that this product promotes and the extent of transfer.

Although the evidence of transfer of learning through computers is limited, some evidence exists that computer-assisted instruction is effective for improving academic skills in significantly less time than conventional classroom methods (Kulik, Bangert, & Williams, 1983; Kulik, Kulik, & Cohen, 1980; Thomas, 1979). This is probably because of the immediacy of corrective feedback. Additionally, one study examined the transfer of estimation skills in teacher and computer environments. The researchers found that both approaches are associated with transfer gains in simple number estimations and are durable over a 4-week period with children who have learning difficulties (Pearce & Norwich, 1986). Additional information about computer transfer of learning with adult populations is necessary to consider GRT preparation methods.

user and increase confidence. These affective considerations are often neglected in some software evaluations. Clement (1981) stressed that "personal attitudes about using computers in a learning environment can be critical to the success of a computer-based project" (p. 28). Although the potential of the package is evident, research evidence about how the user feels about this method of preparation is needed.

This package expands on traditional approaches for studying for the GRE by including a computer program. Essentially, the user has access to two different methods for preparation.

For those individuals who are required to take the GRE test, this package will be helpful in providing a variety of feedback and opportunities for assessment. If the person enjoys using the computer for learning, this approach may be effective preparation for the GRE. On the other hand, individuals who have not shared educational experiences common to the United States culture may not find this package helpful. Finally, little technical support was provided for the product. Additional research is needed to investigate the cultural fairness, transfer of learning, validity, and reliability of the product.

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