

Arcademic Skill Builders Educational Games: *Engage & Educate* Teachers' Manual

INTRODUCTION

ARCADEMIC SKILL BUILDERS are online games that offer a powerful approach to learning basic math, language arts, vocabulary, and thinking skills through incorporating the features of electronic arcade games. The games feature fast action, colorful graphics and a compelling arcade game format to motivate and teach students.

The ARCADEMIC SKILL BUILDERS programs stem from experience, systematic observations and research by a group of professors at the University of Kansas' Center for Research and Learning attempting to understand student learning in school and social situations. This innovative approach incorporates the advantages of current game technology with educational technology to provide educators with a challenging, fresh approach to teaching and learning.

A Progress Chart can be viewed after each game that enables both teacher and student to observe changes in performance and helps teachers make performance-based decisions about immediate and long-term curriculum needs. The collaboration between student and teacher offers the educator the opportunity to become the “manager” of student learning rather than the tutor. Most important is the fact that this approach allows students to participate in the decision making associated with their own learning.

(NOTE: In the future we'll add features enabling you to save records, tailor content, and pinpoint student problem areas.)

The format of the Progress Chart and its use is an adaptation of a measurement system called *Precision Teaching* developed by Dr. Ogden Lindsley of the University of Kansas. Many of the features of the computer software reflect strategies encompassed in the precision teaching mode.

RATIONALE

The rationale behind *ARCADEMIC SKILL BUILDERS* emerged as a challenge to make certain aspects of classroom instruction as effective in creating persistence and involvement as observed in video game players. The result is a program that incorporates the features of arcade games with educational content to obtain a high rate of learning through rapid and focused repetition, high motivational levels, excitement and involvement. Students must employ strategy under exciting circumstances to make rapid responses while being provided immediate feedback.

Success in learning usually means preventing the student from being discouraged by making too many mistakes. *ARCADEMIC SKILL BUILDERS* also emphasizes success, but *success is reflected by improvement*. Thus, high error rates are important in early stages of learning so that improvement is maximized. A preferred strategy in this program is to start students where they “aren't”-- at a level where a considerable number of errors are made -- and then move back or ahead as their performance requires.

Meeting the needs of individual students is a consideration of the program; however, the emphasis is in making the student “want” to learn. These programs are designed to do that.

Philosophically, the games embrace research on learning dealing with “automaticity” and “fluency.” Automaticity is fast and accurate object identification at the single object level. Fluency involves a deeper understanding and anticipation of what will come next.

Fluency impacts three types of critical learning outcomes:

- Retention: the ability to perform a skill or recall knowledge long after formal learning programs have ended
- Endurance: the ability to maintain performance levels
- Application: the ability to apply what is learned to perform more complex skills in new situations.

These engaging educational games provide focused repetition practice that enables fluency to be achieved more quickly through structured, rapid, and disciplined responding.

The games and strategies for using the games provided in this program are best represented by three motivational features—improvement, fast action, and increasing levels of difficulty.

Improvement. Poor performance in these games is not viewed by players as failure but as a challenge to improve. Improvement comes through three means -- familiarity, feedback, and strategy. Immediate feedback enables the student to assess right and wrong answers. As the player grows familiar with the events, he/she is able to develop and implement strategies to reduce negative consequences and improve performance.

Fast Action. Requiring a high number of responses in a short period of time is motivational and requires good performance. The individual has no time for interfering and distracting thoughts without serious penalty.

Increasing Levels of Difficulty. With *ARCADEMIC*, routine drill takes on an aura of excitement and challenge with the games and strategies that increasingly require the student to face a more difficult situation just as a goal is accomplished. Such a challenge leads students to maximum proficiency.

In summary, *ARCADEMIC*'s total approach is based on a philosophy that includes these principal points:

- **Students respond to challenge**, and errors can be viewed as opportunities to improve rather than as indication of failure. An unlimited ceiling on performance will help the student reach his/her maximum level of proficient performance.
- Needed **repetitious drill can be as fun and as stimulating** as procedures and methods typically associated with the higher order aspects of learning.
- **Immediate feedback** (through the Progress Chart) on the student's responses facilitates improvement in performance. Teachers are better able to implement performance and instructional strategies.

User Requirements:

Browser: [IE](#), [Netscape](#), [Firefox](#)
[Flash Player](#)

BASIC PROGRAM PROCEDURES

STEP 1: Establish Aims

Establishing an aim, or goal performance, for the student in the computer games is an excellent motivational technique. These are programmed for one-minute stages; this seems to be the best time limit for proficiency and motivation in the game. By using the same time per game, the scores represent a consistent rate or frequency of hits and misses. This increases the degree of comparability from score to score.

STEP 2: Explain Procedure

Depending upon the student's experiences with the computer, you will need to spend some time explaining the object of the game being played and the way in which the game operates. After explaining these to the student and establishing a schedule for the work at the computer, observe the student for a few minutes to make sure he or she is operating the game correctly.

STEP 3: Chart Student Progress

The student's hits and misses are recorded in the scores on the screen. The "detail" graphs at the end of the game can be used to note trends in the performance from which decisions on strategies for improvement can be made. It also predicts if the student is likely to reach the aim set and provides visual feedback of progress to both you and the student.

STEP 4: Interpret Student Progress

Interpreting the graph lines of hits and misses (trend lines) is important in setting strategies for improvement and establishing new goals. This should be done at the end of one or two weeks of performance. Interpreting both the correct (hits) and incorrect (misses) responses will enable you to see the degree of accuracy the student is achieving as well as the absolute performance level. By interpreting both of these trend lines, you will have a learning picture from which you can plot strategies for further learning.

STEP 5: Provide Generalization Activities

Once a student has reached an aim within a game at skill level "normal", you may want to provide some activities in which the student uses the skills. You can set up special activities that will demonstrate this use in practical applications. For example: ways of making change, calculating miles per gallon used by an automobile, checking sales receipts from stores for accuracy, estimating various costs of groceries from newspaper ads, etc...

Repeat Steps for Additional Games

The steps listed in this manual should be repeated for each game that the student plays. Use flashcards, worksheets, and other computer games to help the student reach specific aims based upon information gained on the first trials with the program.

Our materials are designed to be used flexibly as the student's needs and learning situation warrant. Each person working with this product is encouraged to adapt the materials in any way possible to ensure a successful learning experience for the student.

Note Regarding Student Safety (Multi-Player Games)

Your students are completely safe while playing the games. In our multi-player games, if the student starts a “private” game, then only players that know the password (created by the student) can join the game. If the student starts a “public” game, then any player from outside can join the game, but there is no contact between outside players and the student. We do not store the player IDs that the student creates. It is impossible for anyone outside a classroom to contact a student while playing the games.

Precision Teaching Links:

Binder, C., & Watkins, C. L. (1990). Precision Teaching and Direct Instruction:
http://www.binder-riha.com/PT_DI.pdf

Precision Teaching Overview, Wikipedia: http://en.wikipedia.org/wiki/Precision_teaching

More precision teaching research links:
<http://psych.athabascau.ca/html/387/OpenModules/Lindsley/references.shtml#lindsley1990b>

Fluency and Automaticity:

Definition and research links: <http://members.shaw.ca/celerationtechnologies/Fluency.html>

Automaticity and memory:
<http://red6747.pbwiki.com/Automaticity%20and%20Fluency>

Video Games in Education Links:

Video Games Stimulate Learning: <http://news.bbc.co.uk/1/hi/education/1879019.stm>

Video Games Valid Learning Tools: http://news.bbc.co.uk/2/hi/uk_news/education/730440.stm

Students Want More Use of Gaming Technology:
http://www.eschoolnews.com/news/top-news/news-by-subject/research/index.cfm?i=53443;_hbguid=305cfa7c-e0a0-474c-8bc3-d65915d4ebce

Gaming Advances as a Learning Tool:
<http://www.eschoolnews.com/news/top-news/index.cfm?i=45627&CFID=6448396&CFTOKEN=98185139>

Effects of Modern Math Computer Games: <http://www.dimensionm.com/index.php?p=research>

More Research

<https://www.bris.ac.uk/education/research/networks/gern/publications>