

Running Head: ALGEBASICS EVALUATION

A Math Teachers Perspective about Algebasics.com

Megan Pule

University of Illinois

EPSY 490:

Tom Anderson

May 14, 2009

About Algebasics.com

Often times a textbook is left at school, misplaced or even worse, does not have enough examples or examples that a student can follow. With the development of the Internet students have begin to rely, increasingly, on the tools of the World Wide Web. Students rely on math-based websites for tutorials, practice problems and assistance in remembering basic procedures. Most commonly, students are seeking a teacher to walk them through the steps, just as a teacher has done in the classroom.

Algebasics.com is designed for Algebra One students and beginning Algebra Two students. The website covers basic content such as adding and subtracting rational numbers, combining like terms, and order of operations. Once a foundation is laid, Algebasics.com covers solving equations, up through multi-step equations, ratio and proportion, inequalities, absolute value, exponents, polynomials, factoring, rational expressions, rational equations, linear equations, functions, systems of linear equations, radicals, quadratics and algebraic applications.

Within each of the sections, Algebasics.com provides video tutorials, which can be paused at various points, led by a teacher. Each video lists a series of steps along with a sample problem that the teacher works through, highlighting aspects of the problem which are being discussed and expressing a final solution. The student user can repeat any portion of each tutorial by simply moving the mouse to the part of the tutorial to be viewed.

Program Evaluation

According to Richard Mayer there are four components to solving math problems. (154-156) The first step is the ability a student possesses to translate statements into an internal representation of the problem. The second step, students should be able to create a coherent situational model of the problem, changing the word problem into an equation or vice versa. Next, students should be able to set a problem solving strategy and monitor progress. Finally, students should be able to apply the rules of arithmetic to solve the problem.

While Richard Mayer begins with a word problem and changes it into a mathematical model, Algebrasics.com does not provide word problems for students to practice. This is a difficult area for students, which teachers are beginning to integrate into homework assignments, tests and content area practices more and more as teaching math evolves. Although Algebrasics.com does not promote word problem solving strategies, each video begins by describing the problem and its components, lists applicable steps to solving the problem and implements appropriate mathematical procedures to solve each problem.

Mayer summarizes the finding in a study conducted by Ma in 1999 (165) to state that “this research demonstrates that an important part of mathematics learning is the ability to build a mental representation of a concrete situation that corresponds to a mathematical problem.” This merely mirrors the typical question, “...but when am I ever going to use this in life?” Students must be able to take a problem, such as $5+2$, and build a life-based experiential model for the context of the problem. A student posed with this problem could relate to how much the bill will be if the cost of a movie ticket is five dollars

and you spend two dollars on soda at the candy stand. If a student is able to represent a math problem in this way, the student is able to build a relationship with the problem, visually making a connection and bringing the problem to life. This allows the student to understand and visually represent what is taking place with the problem.

While Algebasics.com builds on each problem, becoming more and more difficult while incorporating additional components, it does not lay a foundation for transforming the problems into experiences. The site merely focuses on the problem solving steps and less on the students ability to relate to the problem, creating a mental model and foundational understanding for why a particular step in the procedure works and takes place.

Finally, Richard Mayer describes the process of developing a problem-solving plan. First, students should find related problems. While a student can solve one problem they often have difficulty transferring knowledge to similar problems. Thus, being able to identify related problems would should an understanding for the problems components and procedural knowledge. The second step involves restating the problem. If the problem asked students to compare the volume of two rectangular prisms, the student could restate the problem as “Find the difference between the volume of the large prism and the small prism”, indicating that you would subtract the two volumes, $\text{Volume of the large Rectangular Prism} - \text{Volume of the Small Rectangular Prism}$. Finally, the student should be able to break the problem into subgoals. A subgoal of the previous example would be to find the volume of each rectangular prism, or to recall the formula for the volume of a rectangular prism.

Although some problems break the problem solving steps into subgoals, utilizing the process PEMDAS, for completing the order of operations, illustrating when some steps can be skipped during an applicable problem.

Suggested Site Improvements

One aspect of a math help website that I often look for is practice problems. Students need to be able to see the relationship of multiple problems, thus grouping several similar problems together would help a student to be able to find similar components and develop rules for applying the useful information. While Algebasics.com provides one example it does not provide problems for the student to try on their own.

In correlation with practice problems, it would also be beneficial to have problems that a student could either enter the answer to be checked or simply pause the problem and then check the solution at the end of the video. This would allow students to work through the problem and then check each step of the problem, enabling the students to find the source of confusion.

Finally, Algebasics.com focuses on the key components of solving a problem. However, the site does not provide a visual representation of the problem, allowing students to visually connect the problem to a number line. In reference to a case study executed by Case et al. "According to this view, the most important conceptual structure for learning arithmetic procedures is a mental number line." (Mayer, 199) While this suggests a mental model, it would be beneficial for the website to provide a numberline to express

the components of each problem, expressing the interactions of numerical representations. Similarly, the website should include at least one word problem drawing a connection between the problem basics and the real world.

Reference

Algebasics. (2007) *algebasics Algebra Tutorials*. Retrieved May 14, 2009 from
<http://www.algebasics.com/index.html>

Mayer, Richard E. (2008). *Learning and Instruction*. (2nd ed.). Columbus: Pearson Merrill
Prentice Hall.