

Educational Software Project: Math Games

Project Statement of Needs

The Mad River School District has decided to provide its elementary school students with the opportunity to practice and improve their Math skills. To fulfill this need, the school district applied for a grant to pay for any necessary software, hardware, as well as training and recently received notification it was awarded the grant! The exciting news is that the funding for the grant is largely non-discretionary, with the goal of developing software using technology that best helps elementary-aged school kids learn spelling. The school district currently has a computer lab in each school, running a collection of Windows PCs and well as Macs. However, the nature of the grant will allow the school district to upgrade the machines – or purchase tablets – per the software requirements.

Your company has been selected to develop the Math game software for the 1st and 2nd graders (6 and 7-year olds). If this software is successful, then the software for the subsequent grades may also be awarded to your company.

In 14 weeks you will deliver the final product to the school district. Intermediary releases will enable continuous feedback. The students and teachers in the district's classrooms and computer labs will use the final product. The success of this project is critical, as the students need assistance in their math skills as they prepare for the state's standardized tests.

Instructional Requirements

The software needs to provide the students with an opportunity to practice the Math skills learned in class. The concepts include:

- Simple addition (single digits and double digits).
- Simple subtraction (single digits and double digits).
- Recognizing numbers at the ones, tens, and hundreds place.

All numbers and results need to be positive integers. Correct mathematical terminology should be used, but the terms need to be age-appropriate (e.g. sum, minus, equals). As the students are young, the game(s) that you create need to be engaging and use bright colors and simple vocabulary need to be used. Also, when the students are given a problem to solve, he/she needs to receive feedback as to the correctness of his/her answer. Correct answers need to be acknowledged and incorrect answers need to be acknowledged with the correct answers shown (ideally immediately but this is flexible).

The instructional activity should be challenging, but not too difficult. The approach taken in your game needs to be appealing to the young audience.

In order to support the educational aspect of the system, student progress needs to be assessed. To accommodate this need, the program can generate a certificate with the student's progress

and the teacher can view a student's long-term progress in the program. To facilitate this, each student must enter and verify his/her name upon starting the gaming session. Upon completing a gaming session (which may consist of more than 1 game), the student can generate a gaming progress. Additionally, the teacher can view a student's progress history, whereby the date of each game is printed along with the games score and percentage of problems answered correctly.

In addition, the teacher also needs to be able to add math problems to the system. This added feature will allow teachers to maximize the usefulness of the system by increasing the set of possible problems.

User Characteristics

The **primary users** will be 1st and 2nd graders (6 and 7-year olds) **students**. Many of the kids in this school district have some basic computer familiarity consisting of the ability to:

- use a computer mouse;
- identify the keys on the keyboard and use them to put together numbers, short words, and their name (but they can't touch-type);
- start the computer and programs;
- click on objects (including icons) on the screen;
- enter information in data fields.

Young children need to be engaged by an interactive system, rather than just a computer-based lecture and test approach. Child-friendly themes and lively colors (and sounds) will help in this endeavor. It is also important to keep in mind that children this age are still learning to read and write. Their vocabulary is still being developed.

The **secondary users** will be **teachers** of the students. The teachers will have differing levels of computer literacy. While many universities require a computer literacy course for graduation, many teachers earned their degree before such a requirement existed. At a minimum, the teacher will know how to:

- start the computer;
- start the program;
- select an item from a drop-down menu;
- click on icons;
- enter information in data fields;
- select options from a set of radio buttons, set of check boxes, and a drop-down list.

Since teachers are college-educated, they can read and follow instructions. Many teachers use word processing and gradebook programs. As such, the use of such application software will prepare them for the utilization of new computer programs. Some teachers are quit savvy using technology, whereas others are still reluctant.

Both the students and teachers may have had some exposure with tablets, but there are no guarantees, as tablets are currently not provided in schools. However, to support an engaging

learning system, the grant funding will allow the purchase of tablets – as well as any necessary training – if your software is tablet-based.

Documentation

Your final project should be submitted with online documentation describing how the software functions.

System Requirements

The Mad River School District has no strict policy with regards to what technology the software must be developed with. Fortunately, the grant funding will accommodate whatever hardware needs your software platform requires, as well as any specific training. You may choose to develop a web-based game, a stand-alone desktop application, or a mobile application that is tablet-based.