

## **Quality Assurance Test Results**

Key Seeker – Keyboarding for Kindergarten  
<http://keyseeker.org>

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## **Executive Summary**

Key Seeker – Keyboarding for Kindergarten is an interactive learning tool developed to introduce children (age 5) to the concept of keyboarding and assist them in letter recognition. The tool is based on paired associative learning theory. Letters displayed on the screen in purple should be input with the child's left hand. Letters displayed on the screen in green should be input with the child's right hand. Also incorporated into the tool is a carefully designed sequencing algorithm to aid in the learning process and letter mastery.

Ann White, a student at the Art Institute of Atlanta recently completed a formal quality assurance test for Key Seeker – Keyboarding for Kindergarten.

## **Purpose of Quality Assurance Testing**

The purpose of quality assurance testing is to insure that the application is free of technical bugs and some usability issues. The game may be used on a variety of machines with a variety of internet connections. As macromedia Flash is cross platform, the quality assurance testing for the project is best accomplished by "playing" the game.

A variety of browsers, platforms and screen sizes were tested.

## **Goals of Quality Assurance Testing**

Usability testing and quality assurance testing attempt to address two different aspects of production. The goal of these quality assurance tests is to be certain the elements of the game are correct.

- Purple letters on the screen are the same for the purple side of the keyboard, and green for green
- The animations run smoothly and in a timely fashion (pace)
- The printing portion of the game is technically sound and error free
- The sequence of letters is correct for right and wrong answers
- The navigation between help screens, print screens and go screens runs smoothly and properly
- All buttons operate in a logical manner and audio is used properly for direction

## **Participants**

Participants were screened to insure that the participants had some technical background and could understand what technical issues may occur during the game. They needed to at least have been using the internet for three years. If they were online participants they needed at least a beginner level rating in Flash with some experience with Action scripting. Although this group was be unable to test for "usability" issues for the target audience, they will be able to detect any technical and general usability issues with the game.

## **Methodology**

Both bugs and usability issues were addressed. The game was put in front of 8 people (5 pc users 3 mac users) who have not been involved with its development, they were given some general direction and requests, and then they played the game.

Quality assurance was conducted at the Art Institute of Atlanta and with an online community of four. Each session took no more than 1 hour. Not all sessions were observed by a facilitator. The online testers were given the flash .fla file and asked to run the game first from within the flash player. Several trace statements were placed within the code to attempt to keep track of potential problem areas. Respondents were then asked to make a .txt file of the game session and give a written account of what happened (if an error appeared in the game). Those files were then forwarded to the developer for further analysis. Performing the initial quality assurance tests in this manner helped the developer to identify problems with the logic being programmed prior to incorporating any design assets into the game.

This allowed for iterative testing on the programming aspect of the game. In the mean time small informal usability tests were done on the game assets, animation and sound for its entertainment and educational value. This allowed both the design and programmatic aspects of the game to move forward at separate paces.

The beta game was played on both PC and Mac machines and a variety of browsers (listed below). Technical issues were observed and recorded for each participant.

The cumulative results from the latest round of quality assurance testing held August 27, 2006 (prior to usability testing) are included on page 6 of this report.

## **Testing Outline**

- \_\_\_ Make certain consent form has been completed
- \_\_\_ Make certain screening questionnaire has been completed
- \_\_\_ Explain a little about Key Seeker
- \_\_\_ Explain How the observation works – observations must be recorded on paper
- \_\_\_ Assign a Machine and a browser
- \_\_\_ Assess the navigation
- \_\_\_ Complete Task Scenarios
- \_\_\_ Complete Post Questionnaire

## **Test Environment and Equipment**

The Art Institute of Atlanta computer lab will serve as both the observation and evaluator room. Clients will not be present for the testing.

## **Roles**

**Test Administrator/Facilitator:** Overall coordination of the individual test, explain the test activities and administer questionnaires. Responsible for taking observation notes. Primary person the test subjects will interact with.

## **Evaluation Measures**

The evaluation measures are a combination of quantitative measurements and subjective observations. The quantitative and qualitative data measures are listed below

| <b>Quantitative Data</b>                                                                                                                                                                          | <b>Qualitative Data</b>                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of problems encountered<br>Number of errors or unsuccessful tries<br>Interviews before the test<br>Interviews after the test<br>Flash output text from trace methods written into the code | Facial Expressions<br>Verbal comments when they think out loud<br>Spontaneous verbal expressions (comments)<br>any solicited or non solicited recommendations |

## **Recommendations report:**

As a result of several rounds of quality assurance testing, many logic errors were found and repaired. The majority of these issues were found by the online testers.

### **Areas needing improvement upon initial testing:**

- Working with arrays – sequencing of displaying letters
- Key Listeners – determine which key was pressed and what specific action should be taken not all letters responded consistently
- Development of counters to track the appearance and disappearance of items
- Making sure all help screens and audible cues made logical sense
- Making sure the audio was smooth and volume levels were pleasant
- When to keep sounds on and when to turn them off
- Timing of animations needed to be consistent – no letter should have more importance than any other letter
- Placement of Buttons – audio on the buttons
- Appearance of the banana rewards

## **Solutions:**

Most errors found were solved easily. Some errors were unanticipated – my inexperience with Flash logic was brought forward, but tackled and errors were corrected. The only solution I am still not happy with is the refreshing of the html page to get all the key listeners in Flash to stop listening once a movie is unloaded from the main timeline.

The refresh solution adds an extra click for the user to actually go to the game, but it was a solution. Without refreshing the page, the game would still keep in its memory the last letter that had appeared on the stage and try to give audible incorrect responses when in fact the user had input the correct letter. This was a major problem with the game. Better solutions are still being investigated as of this writing.

## **Future Recommendations**

- Include an audio control on the instructions screen
- Add a variety of audible responses and a variety of animations for each letter and dynamically generate those responses randomly.
- Use the counters data to supply information to the teachers – what letters take more tries?
- Fully develop the print function to read the mastered letters from the learned bin and print those specific letters.
- Build more levels of difficulty

## **Summary**

The iterative testing on the game proved to be the most useful in furthering the development of the game. Without such testing, a fully designed game complete with audio and animation assets might have gone into usability testing and failed, not based on its usability but on technical errors or errors in logic. Quality assurance testing brought forth many issues that had not been addressed in the original conceptualizing and process flow design of the game. It helped lead the developer toward coding in a manner which would allow for future enhancements to the game.

## Quality Assurance Document

|                          |                                |
|--------------------------|--------------------------------|
| <b>Web Site Name:</b>    | http://keyseeker.org           |
| <b>Connection Speed:</b> | cable no dial up was tested... |

|                      | <b>Correct Color Letter for Keyboard side</b> | <b>Layout</b> | <b>Printing function</b> | <b>Script Errors</b> | <b>sequencing for incorrect letters</b> | <b>"timing" for animations - pace</b> | <b>General Errata</b>            |
|----------------------|-----------------------------------------------|---------------|--------------------------|----------------------|-----------------------------------------|---------------------------------------|----------------------------------|
| <b>IE 5.x (PC)</b>   | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |
| <b>IE 6 (PC)</b>     | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |
| <b>Firefox (PC)</b>  | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |
| <b>Netscape (PC)</b> | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |
| <b>Opera (PC)</b>    | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |
| <b>Firefox (Mac)</b> | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |
| <b>Safari (Mac)</b>  | correct                                       | no shifting   | no error                 | none                 | CORRECT!                                | smooth no delay                       | page flashes at refresh for game |

## **Appendices**

### Forms and Surveys

#### **Consent Form**

Thank you for participating in the Quality Assurance testing for the Key Seeker ,  
keyboarding game.

I, \_\_\_\_\_ voluntarily agree participate in this  
testing, and observation. I understand that the observation and testing is being  
done for educational purposes only. Any feedback provided will be used to enhance  
the educational software. The participant may stop at any time. Any information  
provided by me for this testing is to be used solely for research purposes in  
relationship to this project.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
date

**Participant Screener**


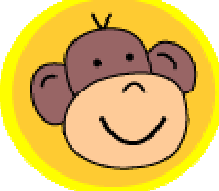
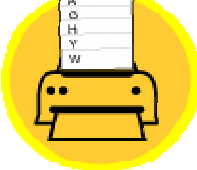

|                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Have you been using the Internet (including using e-mail, gopher, ftp, etc.) For more than 3 years?</p>                                                                                | <p>if yes, continue<br/><br/>if no: thank you for your participation.</p>                                                                                                                                                                                                                                                                   |
| <p>Are you familiar with Flash Actionscripting? If yes, what level?</p>                                                                                                                   | <p>beginner<br/>intermediate<br/>expert</p>                                                                                                                                                                                                                                                                                                 |
| <p>What do you usually do on the internet? (e.g., email, use reference materials such as encyclopedias and dictionaries, read news, curriculum activities, games, entertainment etc.)</p> |                                                                                                                                                                                                                                                                                                                                             |
| <p>What is the primary language spoken at home? (i.e., the one you speak most of the time)?</p>                                                                                           | <p><input type="checkbox"/> English<br/> <input type="checkbox"/> Spanish<br/> <input type="checkbox"/> Chinese<br/> <input type="checkbox"/> French<br/> <input type="checkbox"/> German<br/> <input type="checkbox"/> Dutch<br/> <input type="checkbox"/> Japanese<br/> <input type="checkbox"/> Other:<br/> specify _____<br/> _____</p> |

|                                            |                                                                                                                                                                                                                                       |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>How frequently do you use internet?</p> |                                                                                                                                                                                                                                       |
| <p><b>Home</b></p>                         | <p><input type="checkbox"/> Daily   <input type="checkbox"/> Weekly   <input type="checkbox"/> Monthly   <input type="checkbox"/> Less than once a month<br/> <input type="checkbox"/> never   <input type="checkbox"/> can't say</p> |
| <p><b>School</b></p>                       | <p><input type="checkbox"/> Daily   <input type="checkbox"/> Weekly   <input type="checkbox"/> Monthly   <input type="checkbox"/> Less than once a month<br/> <input type="checkbox"/> never   <input type="checkbox"/> can't say</p> |
| <p><b>Work</b></p>                         | <p><input type="checkbox"/> Daily   <input type="checkbox"/> Weekly   <input type="checkbox"/> Monthly   <input type="checkbox"/> Less than once a month<br/> <input type="checkbox"/> never   <input type="checkbox"/> can't say</p> |
| <p><b>Cyber Café</b></p>                   | <p><input type="checkbox"/> Daily   <input type="checkbox"/> Weekly   <input type="checkbox"/> Monthly   <input type="checkbox"/> Less than once a month<br/> <input type="checkbox"/> never   <input type="checkbox"/> can't say</p> |
|                                            |                                                                                                                                                                                                                                       |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Other</b>                                              | <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Less than once a month<br><input type="checkbox"/> never <input type="checkbox"/> can't say                                                                                                                                                                                                                                                 |
| Please indicate the highest level of education completed. | <input type="checkbox"/> Grammar school<br><input type="checkbox"/> High School or equivalent<br><input type="checkbox"/> Vocational/Technical School<br><input type="checkbox"/> Some College<br><input type="checkbox"/> College Graduate( 4yr)<br><input type="checkbox"/> Master's Degree (MS)<br><input type="checkbox"/> Doctoral Degree (PhD)<br><input type="checkbox"/> Professional Degree (MD, JD, etc)<br><input type="checkbox"/> Other: Please Specify |
| What is your primary computing system platform?           | <input type="checkbox"/> Windows<br><input type="checkbox"/> Macintosh<br><input type="checkbox"/> Linux<br><input type="checkbox"/> Unix<br><input type="checkbox"/> Other: Please Specify<br><input type="checkbox"/> Don't know<br><br>(match participants accordingly)                                                                                                                                                                                           |

**Navigation Assessment:**

Do the links work properly?

|                                                                                                                                                                                                                                                                           |                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|  A green circular button with a yellow border containing the word "GO" in purple, stylized letters.                                                                                      | <ol style="list-style-type: none"><li>1. Begin the game after instructions</li><li>2. Return to the game option(at exit)</li></ol> |
|  A yellow circular button with a yellow border containing a cartoon monkey face with a brown body and a smiling expression.                                                              | Help(play the instructions)                                                                                                        |
|  A yellow circular button with a yellow border containing a yellow printer icon with a sheet of paper coming out of it. The paper has the letters "A", "S", "H", "Y", "W" printed on it. | Print(performs the print function)                                                                                                 |
|  A red octagonal button with a yellow border containing the word "STOP" in white, bold, capital letters.                                                                                | Exit game (go to print screen option)                                                                                              |
|                                                                                                                                                                                                                                                                           |                                                                                                                                    |
| Other comments before beginning:                                                                                                                                                                                                                                          |                                                                                                                                    |

**Scenarios/User Tasks**

**Key Seeker OBSERVATION FORM**

\_\_\_\_\_Participant ID

Browser \_\_\_\_\_ Mac or PC \_\_\_\_\_ Screen Size \_\_\_\_\_

**Introductory animation**

Does it run smoothly (load correctly, quickly)

Can it be heard easily?

Suggestions or Comments

Any Errors?

**Round One – Key Seeker**

Beginning game play

Please write down the sequence of the letters as they appear.

right 1<sup>st</sup> try – does the letter reappear? (when)

Right 2<sup>nd</sup> try– does the letter reappear? (when)

Right 3<sup>nd</sup> try– does the letter reappear? (when)

Right 4<sup>nd</sup> try– does the letter reappear? (when)

Right 5<sup>nd</sup> try– does the letter reappear? (when)

Never get it right – record what happens

Please record Any technical issues that come up

Print Test  
Any Errors?

Get 5 letters correct – then end the game  
Print test

Exit the game

Keyboard Color = Screen Color

|   | Color  | Correct? |    |
|---|--------|----------|----|
| A | purple | YES      | NO |
| B | purple | YES      | NO |
| C | purple | YES      | NO |
| D | purple | YES      | NO |
| E | purple | YES      | NO |
| F | purple | YES      | NO |
| G | purple | YES      | NO |
| H | green  | YES      | NO |
| I | green  | YES      | NO |
| J | green  | YES      | NO |
| K | green  | YES      | NO |
| L | green  | YES      | NO |
| M | green  | YES      | NO |
| N | green  | YES      | NO |
| O | green  | YES      | NO |
| P | green  | YES      | NO |
| Q | purple | YES      | NO |
| R | purple | YES      | NO |
| S | purple | YES      | NO |
| T | purple | YES      | NO |
| U | green  | YES      | NO |
| V | purple | YES      | NO |
| W | purple | YES      | NO |
| X | purple | YES      | NO |
| Y | green  | YES      | NO |
| Z | purple | YES      | NO |

**Imagine – if you can that you are 5 years old....**

Were the instructions clear?

Did the game make sense?

Was the game fun?

Did it hold your attention?

**Now, as an adult:**

What changes or enhancements would you suggest?

Did you notice any bugs? If so, what were they?

Did anything happen that kept you from finishing the game?

How were the sounds?

Other comments