EFFECTIVE QUIZ MAKING: EVALUATING iQUIZ MAKER

iQuizzlers: Avril De Guzman, Aruna Sai Kuna, Karly Wortmann
(avrildg@iastate.edu, askuna@iastate.edu, karlyw@iastate.edu)
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Section 1: Motivation for the usability test

Many a school has come across a great debate of allowing personal technologies into their schools and classrooms. In response to these debates, teachers have also argued whether the personal technologies are a distraction, of no consequence, or strategically placed tools of instruction. Many teachers who have fear of technology but are willing to take some risks have learned to harness the tools and make them a part of the academic environment. One of the personal electronics we speak of is the ubiquitous iPod - a piece of technology that has found its way into millions of students' pockets. If the latest technology is so easily available, why might a school district ban something they should embrace to help teach 21st Century Skills (Partnership for 21st Century Skills, 2002)?

Technology is the key player of most professional lives during the present digital age, which is being transformed into a more explicit era known as the information age (MacIver, 2007). Students need to learn the 21st century skills that will teach them that every piece of technology they touch may be used for a multitude of reasons. What is important is they have the chance to learn and practice the skills needed for that multi-tasking type of higher order thinking. This education has been put upon the teachers who overall have a fear of the ever changing technologies of today and tomorrow. Fortunately teachers have the responsibility to help teach students the skills they will need and not to teach them all of the details of each piece of equipment (ISTE, 2007). One simple piece of software to help create educational review quizzes is available for the iPod. This software was released in 2007 and is available to helps students use their iPod as a learning tool.

iPods can be used in many different ways as a learning tool and the options increase as more teachers become innovative. One way they may be used in and out of the classroom is to record songs that have an academic purpose to help their students remember new concepts. Another way is to use the recording features when a microphone is plugged in so that many students have access to lectures they may have missed or to revisit materials they did not understand. In the field of special education, games on an iPod, which has few keys can help students with motor disorders to practice the difference between light and hard touches, estimating directions, and focusing on small details.

Lastly, an iPod can now be used for educational practice and review. A software called iQuiz Maker allows a teacher to prepare a quiz on the subject they taught recently or earlier in the year. Students have the capability to put the quizzes on their iPods for practice and review anywhere (during and outside the school day). Teachers may also use the idea of the quizzes in their classrooms if they are doing small group work or if the students are visiting several stations (if available) about the room. There are many more possibilities but this project will focus on the iQuiz Maker software.

Section 2: Description of the Prototype

Aspyr Media, Inc., a "leading quiz game publisher that creates packages and delivers fun to the people around the world" (http://www.aspyr.com), launched iQuiz Maker in 2007 to allow anyone to create his or her own customized quizzes for iPods, which can also be shared with friends and others. Aspyr first released a version for use on the Mac, and later one for PC. The free software may be downloaded from the iQuiz Maker website (http://www.iquizmaker.com).

Once the software is installed in the computer, users will be able to begin creating quizzes according to their needs and interest. The software allows users to make up to 1000 (text only) true/false and multiple choice questions. After quizzes are created, they are ready to be transferred to users' iPods. This transfer process is done using another software called Quiz Installer. For the purposes of this project, however, we shall only focus on the process of creating a quiz using iQuiz Maker software.

iQuiz Maker has many convenient tools for creating quizzes for iPods. The interface (Figure 1) appears as a three pane window. At the top of the window are the tools needed for creating the quizzes. Below, at right side of the window is a space for all the listed questions and the left side has a preview area for the selected question.

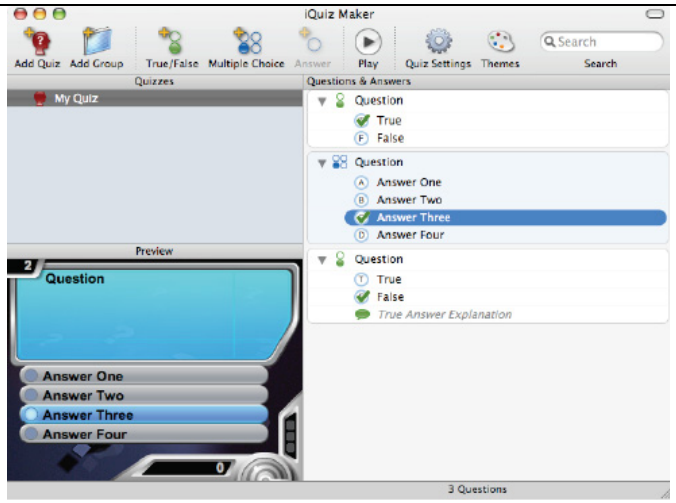


Figure 1. *iQuiz Maker's interface.*

The following section outlines the basic steps of creating the quizzes; a complete description is found in the iQuiz Maker users' guide (Appendix A). Start making the quiz questions by clicking on the "Add Quiz" button and a new empty new quiz appears at the left side of the window. Users can add and edit questions in that quiz by simple double clicking on each question. If a teacher wants to add multiple-choice questions, the command "make question to multiple choice" can be selected. The same can also be done for a true-false question. iQuiz Maker also provides a customized tool that allows answers to be referred back at the end of the each question. Footnotes below the question may also be used to provide the explanation for each correct answer or even why an answer is wrong. After quizzes are created, they can be checked for errors and flow by playing them in the iPod simulator function (Figure 2).

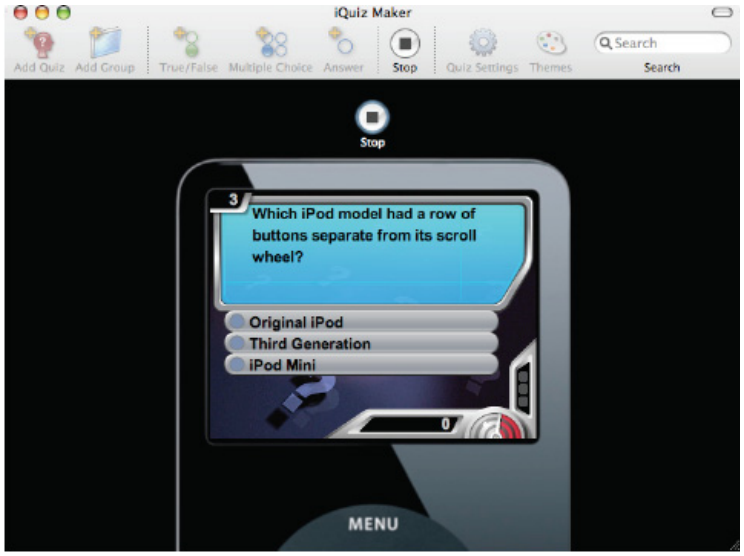


Figure 2. *iQuiz Maker's iPod simulator function.*

Quizzes can then be organized into groups such as science, mathematics, sports etc. One can also arrange the quizzes according to one's priority by simply dragging from one place to another. Teachers can also give the quizzes a 'local flavor' by using preferred language, theme or graphics by clicking on the quiz settings (Figure 3). After the quiz is finished, it will be ready for sharing with other people by clicking the "export quiz" button in the file menu; and the whole quiz will be saved as a single file. Teachers can then give this file to their students to play.

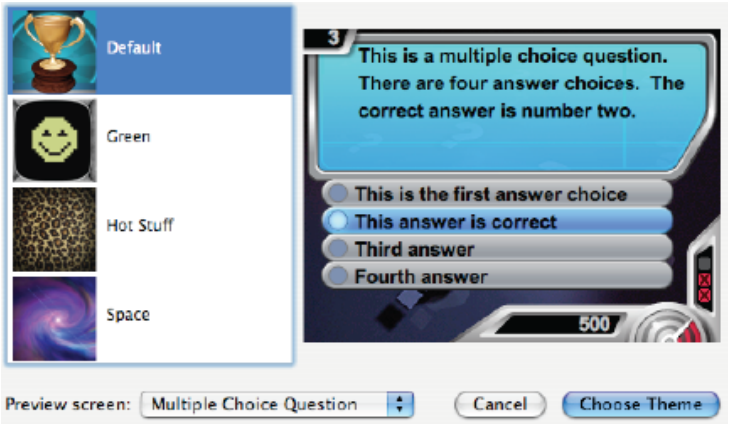


Figure 3. *An example of a quiz question on the software as well as available customization function.*

Section 3: Description of the target audience

The participants of the proposed usability test of the software called iQuiz Maker are K-12 teachers. However, for the purpose of this project, we have limited the scope to those teaching Mathematics in middle school (grades seven and eight).

In the context of the United States' educational system, at the national level (National Center for Education Statistics, 2006), middle school teachers have an average of 11 to more than 20 years of teaching, most (87%) of who majored in Education with at least a bachelor's degree (99%). Most (91%) of them would also have full certification. In addition, more than half (55%) would be female, white (88%) ranging from 30-49 years old (55%). Iowa teachers do not differ much from the national average. Most Iowa public school teachers (Iowa Department of Education, 2007) are about 42 years old, female with almost 15 years total teaching experience and almost a fifth (15.3%) of them have an advanced degree. There are about three (3.3) students per computer in Iowa schools and almost all (96.3%) of these have internet access while almost three-fourths (70%) of school buildings have wireless internet

access.

Of the 355 teachers in the Ames school district in the state of Iowa in the Midwestern United States, almost half (47%) have a Masters degree and almost a fifth (15%) have worked in the district for 20 years or more (Ames Community School District, 2007). In terms of technology, there is a computer for every six students in the Ames School District and nine courses (via Internet) are offered via telecommunications, twice the state average of 4.5 courses.

Section 4: Description of intended outcomes

The main goals (Rubin, 1994) of any usability test are to ensure that a product is easy to learn and use, satisfying to use, and provides utility and functionality that are highly valued by the target population.

Usability Testing Objectives (according to the developers of the iQuiz Maker)

- write;
- create; and
- package custom quizzes.

For this project, we also intend to test the iQuiz Maker based on three outcome domains defined by Bloom's (1956) taxonomy: cognitive, affective and psychomotor. The cognitive domain involves knowledge and the development of intellectual skills. Recall or recognition of specific facts, procedural patterns, and concepts related to the software are measured in this domain. The affective domain includes the manner in which users deal with the software emotionally; such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. Finally, the psychomotor domain includes physical movement, coordination, and use of the motor-skill areas; which can be measured by speed, precision, procedures, or techniques in execution. For this usability test, the focus is only on affective and psychomotor domains.

***Affective*:** Middle school Math teachers will be able to

- Rate their overall satisfaction of iQuiz Maker's usability
- Explain the value (if any) of the iQuiz Maker in their work
- List the pros/cons of using iQuiz Maker in your classes as a review tool
- Have increased awareness of educational software (iQuiz Maker) that may be used on iPods

***Psychomotor**:* Middle school Math teachers will be able to:

- Create a 4-point quiz on a Math lesson based on current standards
- Use multiple-choice type of questions
- Use true/false type of question
- Consult the user's guide for help during the test

Section 5: Description of testing method

The standard assessment test (Rubin, 1994), often conducted "early or midway into the product development cycle" will be used for the usability testing of iQuiz Maker. This type of test is mainly employed to evaluate the "usability of lower-level operations and aspects of the product" (p. 38). By using the assessment test, we seek to determine how well the middle school mathematics teachers make use of iQuiz Maker to create quizzes on subject matter relevant in their work. This test will also allow us to identify the problems met by the users. An important characteristic of this test is the performance of tasks by the user and focus is placed on actual behaviors.

Section 6: Description of room set-up

The pilot test will be conducted in a Mac computer lab located in the basement of the education building, Lagomarcino Hall, on Iowa State University campus. Due to limited administrative access to the computers in the lab, we will be providing laptops that have the appropriate software installed. There will be room (Figure 4) for the four pilot testers at the back of the room near the door. They will each have their own Mac laptop that will be recording (via screen capture using Snapz Pro X) their progress through the test (See Figure 1). An audio recorder will be present between the laptops for any additional vocal clues for the ease of use. One video camera will be setup near the front of the room aimed to gather their facial expressions during the usability test. A monitor will be in close proximity to the testers and recording any significant data during the testing.

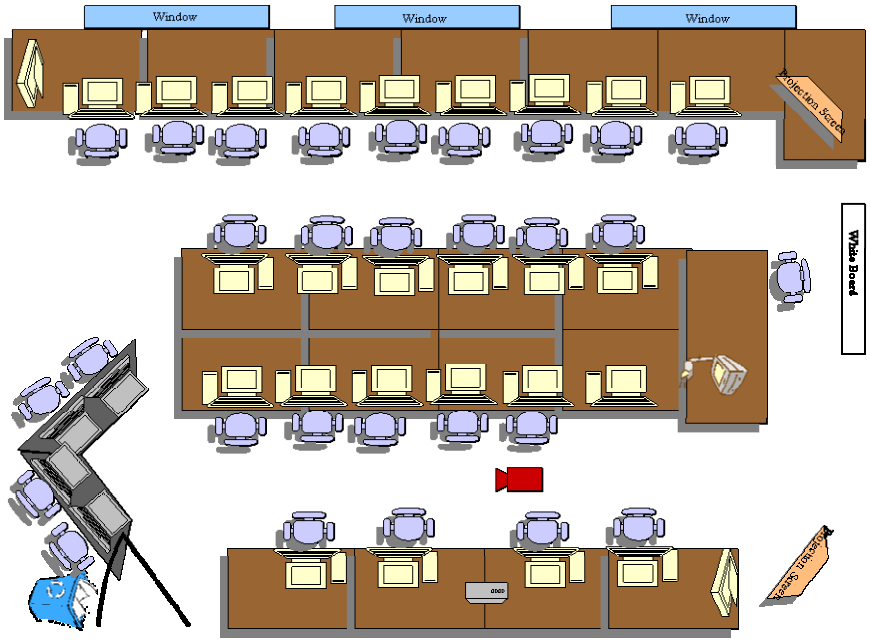


Figure 4. A simple layout of the pilot testing room.

The testers will only be sitting directly next to other testers. Each of the testers will have a quiz to work from. The 7th and 8th grade teachers will alternate their positions. The 7th grade quiz has a different order of question types than the 8th grade quiz so that it would be difficult to follow the actions of the neighboring usability tester.

One of the monitors will present the introduction from the front of the room while a PowerPoint targets the main points. Once the introduction is finished, the end goals will be posted in the PowerPoint so that the testers understand where they stop the usability test. All of the roles of the testers and test monitors are explained in detail throughout Section V.

Section 7: Test Objectives and matrix of instruments

Table 1 outlines the usability test objectives, the data-gathering instrument and the specific questions that will be asked to answer the objectives.

Table 1. Usability objectives.

Test Objectives	Methods	Questions	Materials
Rate their overall satisfaction of iQuiz Makers' usability.	Focus group	1. Overall, are you satisfied with iQuiz Maker? Why or why not? 2. On a scale of 1-5, 5 being easy to use and 1 being difficult, rate how easy it is to use iQuiz Maker. Why?	Focus group guide
Explain the value (if any) of the iQuiz Maker in their work.	Focus group	3. Do you foresee iQuiz Maker helping your students learn? Why or why not?	Focus group guide
List the pros/cons of using iQuiz Maker in your classes as a review tool.	Focus group	4. Presuming you have access to a computer with iQuiz Maker and iPods, what are the pros of using iQuiz Maker? 5. What are the cons of using iQuiz Maker? 6. When you went to the users' guide for help, did you get the help you needed?	Focus group guide
Increased awareness of educational software (iQuiz Maker) that may be used on iPods.	Focus group	7. Before this test, were you aware of any educational software to be used on iPods? 8. Of iQuiz Maker? 9. Would you suggest this software to your colleagues?	Focus group guide
Create a 4-point quiz on a Math lesson based on current standards	Observation		Observation Log (will be done via capture software, voice recorder and facilitator notes)
Use multiple-choice type of questions	Observation		Observation Log

Use true/false type of question	Observation		Observation Log
Consult the user's guide for help during the test, if needed.	Observation	When participants went to the users' guide for help, did they get the help they needed?	Observation Log (any time users' guide is opened during quiz creation, a problem is met)

Section 8: Outline and description of the usability test process

Date : March 11th, 2008 (Tuesday)
Location: Lagomarcino Hall N055
Prototype: iQuiz Maker
Participants: Patrick Kreymborg, Ana Correia (seventh grade Mathematics teachers) & Simon Setterstrom, Jacob Larsen (eighth grade Mathematics teachers)
Evaluators: iQuizzlers (Avril De Guzman, Aruna Sai Kuna, Karly Wortmann)
Evaluation instrument: observation guide and focus group guide
Tools used: Mac Computers with iQuiz Maker, video camera, screen capture software (Snapz Pro X), digital camera, and voice recorder

The iQuizzlers (Avril, Aruna & Karly) will conduct usability test in Room N055 of Lagomarcino Hall at 5:10 PM on Tuesday, 11th March 2008. The purpose of the usability test is to determine teachers' opinions and their experiences in using a software product called iQuiz Maker, which was designed to create quizzes for the iPod. The software may be useful for creating quizzes for classes. In light of this, the iQuizzlers sought to conduct a usability test on four middle school Mathematics teachers teaching in the seventh and eighth grades. The total time for conducting this usability test is targeted at one hour and 30 minutes (Appendix B).

This usability test will be conducted by the team in a room with a projector, video equipment and Mac computers. The Mac computers will be installed with the iQuiz Maker software beforehand and they will be checked to ensure that the software is in working condition. iQuiz Maker will be launched on the computers and ready for use before the test starts. In addition, Snapz Pro X, a screen capture application will also be installed on the Mac computers to track the movement and activity of the participants during the test. Data gleaned from the Jing outputs will be used to find out additional information on participants' experience of

iQuiz Maker (Appendix C). A video camera will also be set up in the room for observation of the participants and their environment during the test.

Before starting the actual test, the team members will introduce themselves to the participants. Karly will briefly explain about iQuiz Maker and the purpose of the usability test. Then, she will distribute consent forms which the participants will fill out and sign. Finally, she will tell participants about the activity process.

The actual usability test will start at 5:16 PM, by giving participants a printout of a four-item quiz (Appendix D), which was designed based on current Ames Middle School seventh and eight grade Mathematics standards. The participants will then be asked to use the Mac computers in front of them for creating the quiz using iQuiz Maker. They will also be informed that the user guide is available from the "help" menu. Teachers may use this guide at any time during the test. Thirty five minutes will be provided for all the participants to complete creating the quizzes provided using iQuiz Maker.

At around 5:50 PM, after the participants completed creating the quiz, there will be a 10-minute break. During the second part of the activity, participants will be interviewed by the iQuizzlers through a focus group discussion facilitated by Avril. The focus group will continue for twenty-five minutes; seven questions (Appendix E) will be presented and monitors will be concentrating on participants' opinions and experiences of iQuiz Maker. In addition, the participants will be asked to identify the pros and cons of using iQuiz Maker in their work.

Before wrapping-up the session, the team will ask the test participants whether or not they have any questions about the software or the usability test. If there are any, the team will help clarify the points related to those particular questions. If not, Aruna will wrap-up the session.

Section 9: Data analysis process and results (deliverable 3)

Section 10: Findings and recommendations (deliverable 3)

References:

Ames Community School District. (2007). *District information.* Retrieved February 12, 2007, from http://www.ames.k12.ia.us/Profile.html.

Aspyr Media. (2007). *About us*. Retrieved February 12, 2007, from http://www.aspyr.com/product/info/77.

Bloom, B., Englehart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York, Toronto: Longmans, Green.

International Organization for Standardization. (1998). *ISO 9241-11: Guidelines on usability*. Retrieved February 16, 2008, from http://www.iso.org/iso/about.htm.

International Society for Technology in Education (2007). *National Educational Technology Standards: The Next Generation*. ISTE. Retrieved February 16, 2008 from http://www.iste.org/inhouse/nets/cnets/students/pdf/NETS_for_Students_2007.pdf .

Iowa Department of Education, Bureau of Planning, Research and Evaluation. (2007) *Basic Educational Data Survey (BEDS) Technology File* Retrieved February 16, 2008, http://www.iowa.gov/educate/component/option,com_docman/task,cat_view/gid,177/Itemid,55/.

iQuiz Maker (2007). *iQuiz Maker: Put your friends to the test*. Retrieved February 12, 2007, from http://www.iquizmaker.com.

MacIver, K. (2007). *Developing World. Information Age*. Retrieved February 16, 2008, from http://www.information-age.com/magazine/january-2008/agile-rich-software/280686/developing-world.thtml.

National Center for Education Statistics. (2006). *Digest of Education Statistics*. Retrieved February 12, 2007, from http://nces.ed.gov/programs/digest/d06/tables/dt06_067.asp.

Partnership for 21st Century Skills (2002). *Learning for the 21st Century. Partnership for 21st Century Skills.* Washington D.C. Retrieved February 16, 2008 from http://www.21stcenturyskills.org/images/stories/otherdocs/p21up_Report.pdf.

Henke, R., Choy, S., Chen, X., Geis, S., Alt, M., & Broughman, S. (1997). *America's Teachers: Profile of a Profession, 1993–94,* U.S. Department of Education, National Center for Education Statistics, NCES 97-460. Washington, D.C.

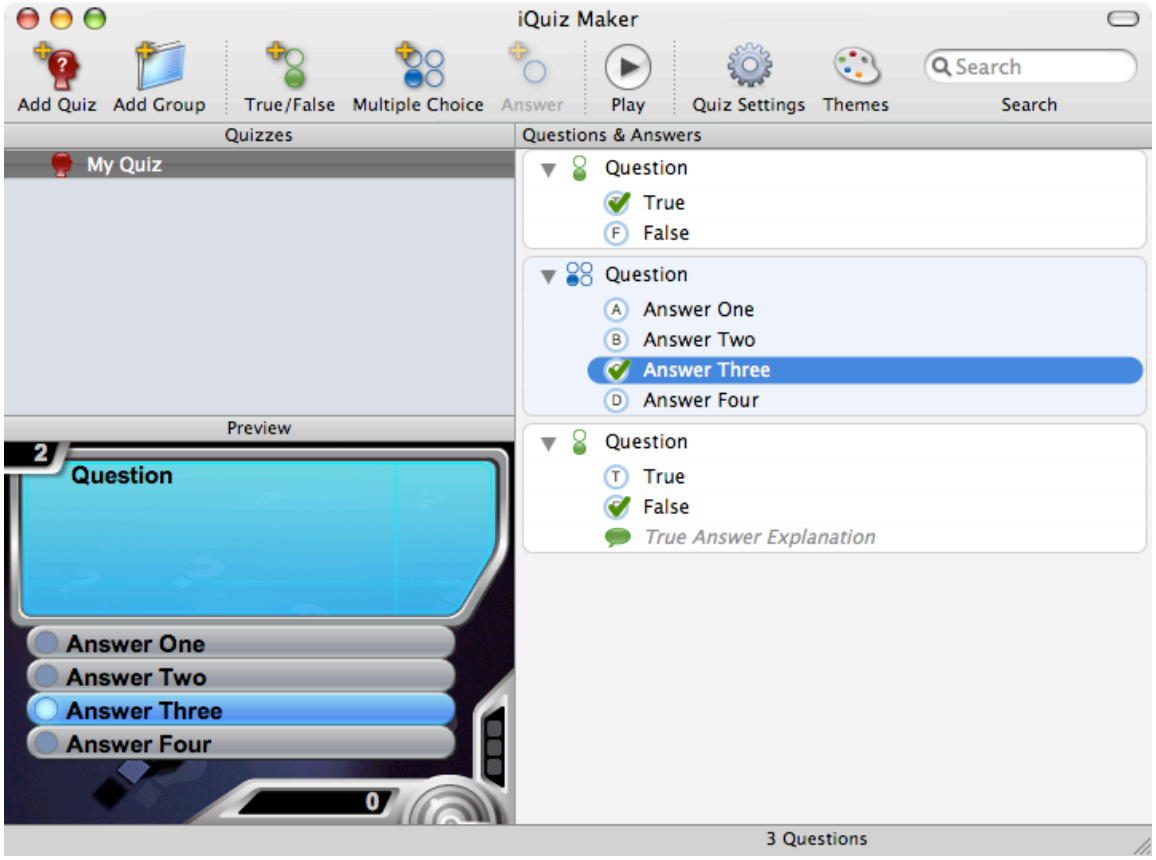
Rubin (1994). *Handbook of Usability Testing*. Wiley and Sons. Canada.

APPENDIX A:
iQUIZ MAKER USER GUIDE

IQUIZ MAKER USER GUIDE

INTRODUCTION

iQuiz Maker is the premier tool for creating quizzes for your iPod. The creation of a quiz is an easy process. The main interface is a three-pane window. At the top left is a list of all the quizzes. At the right there is a list of all the questions and answers for the quiz. At the bottom left is a preview area for the currently selected question.



CREATING QUIZZES

Begin making a new quiz by first clicking on the "Add Quiz" toolbar button. A new empty quiz list is made. For this example, we'll make a quiz about iPods, so name the quiz "iPod". If you want to change the name of a quiz, simply double-click on the quiz name.

A quiz must always have at least one question. When you add a new quiz, it starts out with a single true/false question. For the "iPod" quiz, we'll ask a true/false style question. Double-click on the "Question" text to edit the question. For the first question, let's ask: Are iPods fun to use? The correct answer is, of course, True so we are done with the first question.

Next let's add a multiple choice question. Click on the "Multiple Choice" toolbar button. A new multiple choice question is added to the list. Change the question text to: Which iPod model had a row of buttons separate from its scroll wheel?

To change the answers, again double-click on the answer text you want to change and then enter in the new text. Change the answers to:

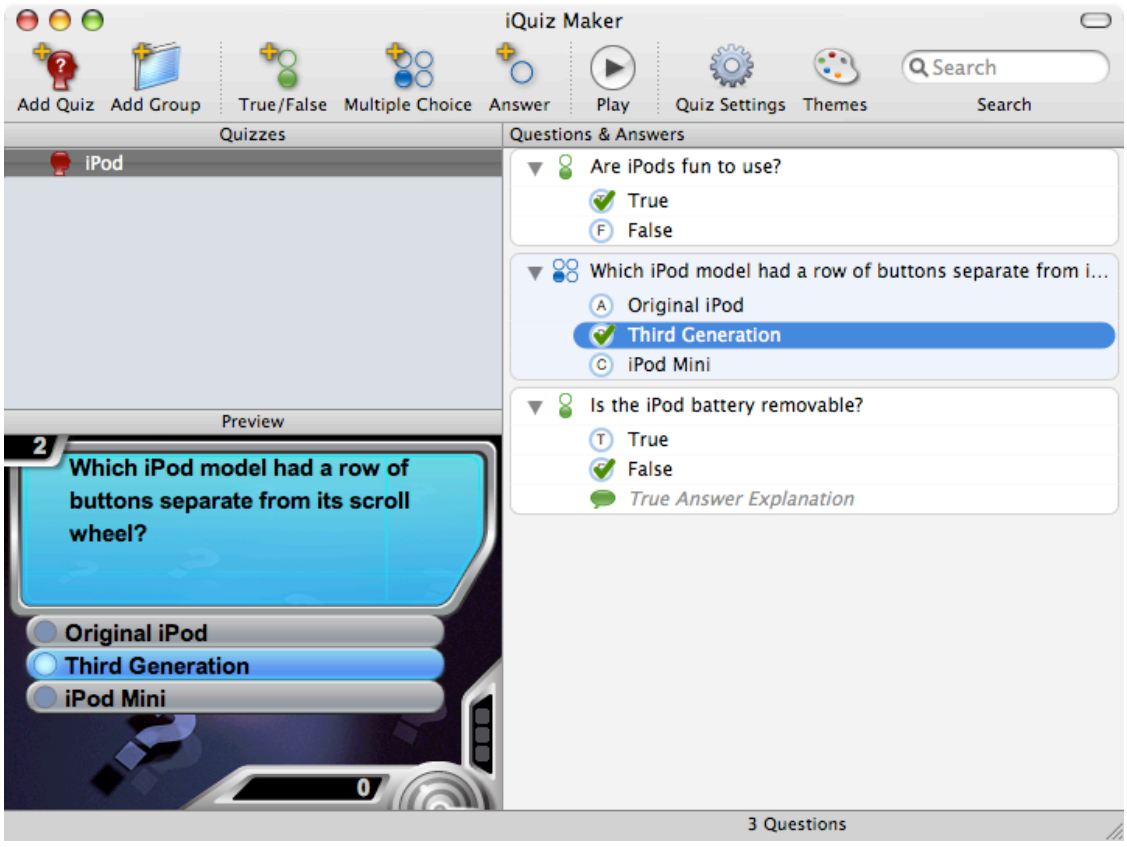
Original iPod
Third Generation
iPod Mini

The correct answer is the Third Generation iPod, so click on the answer circle to the left to set the correct answer check mark. Also since there are only three answers, let's remove the unused fourth answer. Select the "Answer Four" item in the answer list and press the delete key (or choose the Delete menu item from the Edit menu).

Finally let's add another true/false question. Click on the "True/False" toolbar button. Change the question text to: Is the iPod battery removable? Click on the answer circle to the left of the False answer to set the correct answer mark. When the correct answer is false, a new "explanation" area is visible for true/false questions. This optionally allows you to explain why the question is not true. For now we will leave the explanation area empty.

You can rearrange the order of questions (and also answers in a multiple choice question) by dragging and dropping the items to their new location. The order of questions is not important for the quiz, since when playing a quiz the questions are chosen randomly.

You can delete questions from the question list, or even entire quizzes from the quiz list, by selecting them and pressing the delete key.



USING THE SIMULATOR

iQuiz Maker can simulate playing a quiz game without the need for you to first sync the quiz to your iPod. Select the quiz in the quiz list that you want to play, and then click on the "Play" button in the toolbar. The window will change to a picture of an iPod and it will begin playing the quiz. Unlike using the scroll wheel for the real iQuiz game on the iPod, you use your mouse to click on the button to select your answer. You can also abort the game at any time by clicking on the "Stop" button.

ITUNES IPOD SYNCING

To play quizzes made with iQuiz Maker on your iPod, the quizzes must first be synced using iTunes. Simply launch iTunes to begin the sync process. There is an iTunes menu item in the File menu to take you directly to iTunes.

TRUE/FALSE EXPLANATION

When the correct answer for a true/false question is false, a new "explanation" area is visible. This optionally allows you to explain why the question is not true. When left empty, no explanation is given. You can double-click on the explanation area to edit its content. The explanation is always shown when playing a quiz after the question is answered, even if you answer the question correctly. So, for example, you can ask: Is the sky green? The correct answer is False, and the explanation is: The sky is blue.

MULTIPLE CHOICE QUESTIONS

Multiple choice questions must always have at least two answers, and a maximum of four answers. You add new answers by clicking the "Answer" button in the toolbar. You remove answers by selecting them in the list and pressing delete.

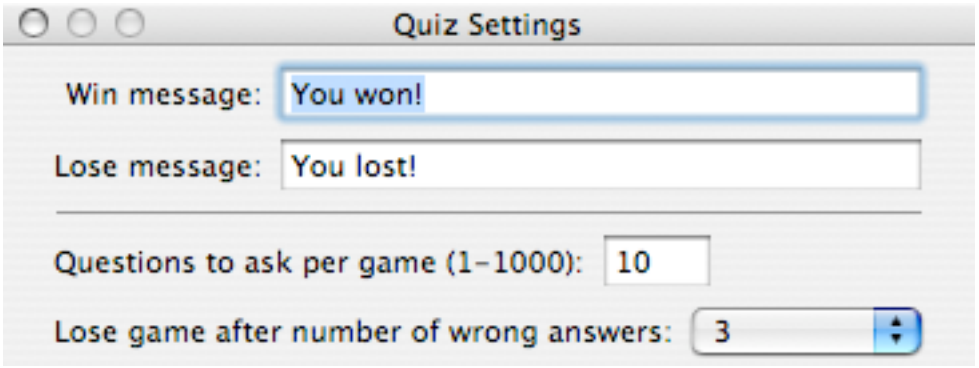
CHANGING QUESTION TYPE

If you have started a question as a true/false question and wish to instead turn it into a multiple choice question, there is a shortcut for doing so. Select the true/false question in the question list and then choose the "Make Question Multiple Choice" menu item from the Questions menu. The question type will turn into multiple choice with two answers labeled True and False. You can then customize the answers by double-clicking on them and changing their answer text, or even adding additional answers.

If you have started a question as a multiple choice question and wish to turn it into a true/false question, select the multiple choice question in the question list and then choose the "Make Question True/False" menu item from the Questions menu. The question type will turn into true/false. All multiple choice answers are removed and the only choices are True and False.

QUIZ SETTINGS

Quizzes have a number of settings you can customize. To change them, click on the "Quiz Settings" button in the toolbar to bring up the settings window. You can customize the message shown for a win or loss after a game is over. Additionally you can choose the number of questions asked per game. (Questions are picked randomly from the entire list of questions before the game starts.) Finally, you can change the number of questions allowed to be answered incorrectly before losing. Choosing "Never" makes the game always ask its complete list of questions, and the game is never lost.



QUIZZES AND GROUPS

Quizzes can be organized into groups on the iPod. For example, you could have a group named "Sports" and then make football, baseball, and basketball quizzes inside the Sports group. To make a group, click on the "Add Group" button in the toolbar. A new group is added to the quiz list. You then drag and drop quizzes into groups. To remove a quiz from a group, drag it out of the group folder. You can remove a group by selecting it in the list and pressing delete. Removing a group does not remove any quizzes that are in the group. Instead, any grouped quizzes are simply moved up to the top level.

SHARING QUIZZES

After you have made a quiz, you may want to give it to other people to play. Select a quiz in the list and then choose the "Export Quiz..." menu item from the File menu to save the quiz as a single file. All quiz information (including the applied theme and any localizations) is saved to a single quizPack file. You can give the quizPack file to anyone and they can then use the "Import..." menu item from the File menu to bring it into their list of quizzes. The next time they run iTunes, the quiz will be synced with their iPod.

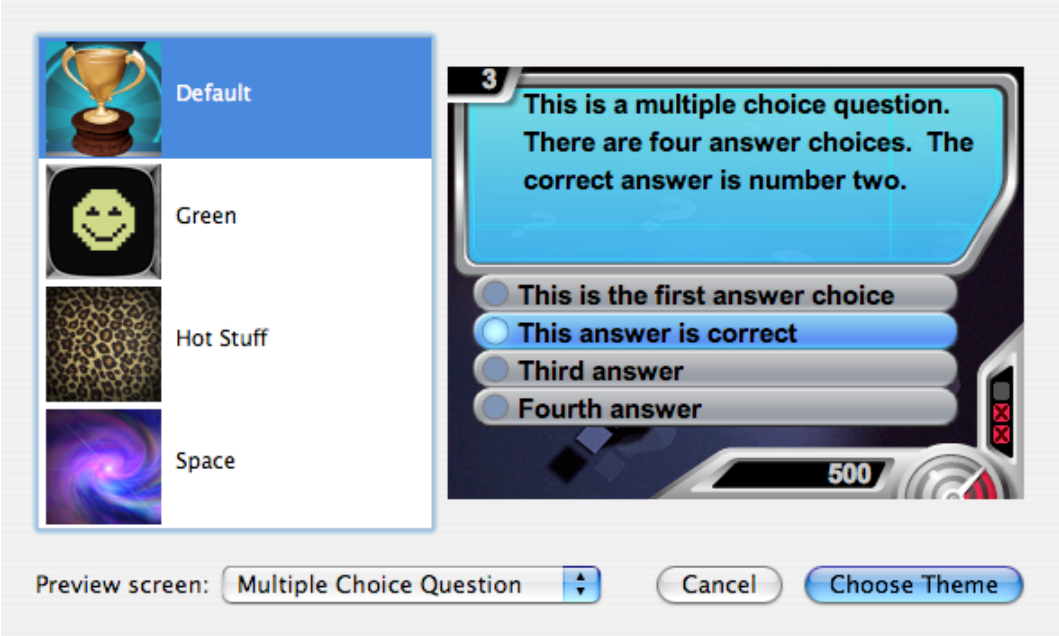
A convenient way to e-mail a quiz is to select the quiz in the list and choose the “Mail Quiz” menu item from the File menu. A quizPack file is automatically created and added to an e-mail message. All that remains for you to do is address the e-mail message and send it on its way.

LOCALIZING QUIZZES

iQuiz Maker can provide localized versions of quizzes. To start a localization, select a quiz in the quiz list and then choose a new language from the Questions menu’s Add Localization submenu. Quiz Settings are separate for each individual localization, so you can localize the win or lose message.

THEMES

The graphics used in the game can be customized from a list of themes. To change the theme for a quiz, click on the “Themes” button in the toolbar. The theme preview sheet appears letting you choose a theme from the list. A chosen theme applies to all localizations in a quiz (i.e. you cannot have separate themes chosen for different languages).



OBTAINING NEW THEMES

iQuiz Maker is able to add to its list of themes. You can look online for new themePack files (from http://www.iquizmaker.com/). Once downloaded, use the “Import...” menu item from the File menu to select the themePack file. Imported themePacks automatically appear in the list of themes the next time you click on the “Themes” button in the toolbar.

SAVED QUIZ FOLDER

iQuiz Maker automatically finds the iTunes folder where quizzes are saved. If you want to save the quizzes in a different location, hold down the option key when you start iQuiz Maker. A dialog asking you to choose a new folder then appears letting you pick a different folder location. Quizzes saved outside of the iTunes folder do not get automatically synchronized with the iPod.

APPENDIX B:

USABILITY TEST SCHEDULE

Table 2. Usability test schedule.

Time	Process	Team member in-charge	Materials
4:30-5:00PM	Set up the Mac computers and video equipment Start the program	Karly Wortmann, Avril De Guzman and Aruna Kuna	Computers, video equipment
5:10-5:15PM	Introduction and consent for usability test Participants will be handed notes about their role assignment in the test	Karly Wortmann	Intro Script Consent forms Note on assigned roles to participants
5:16-5:50PM	Team hands out the printed questionnaire consisting of 4-point quiz for participants to use in creating a quiz using iQuiz Maker Team informs them about user guide availability in the "help" menu Participants will create a quiz using iQuiz Maker and end on the simulator function	Avril De Guzman and Aruna Kuna Karly Wortmann	7th and 8th grade questionnaires Activity outline shown on projector
5:50-6:00	BREAK		
6:01-6:25PM	Focus group discussion	Avril De Guzman (facilitator), Karly Wortmann and Aruna Kuna (assistants)	Focus group discussion guide Questions shown on projector
6:26-6:30 PM	Wrap-up, end of try-out activity	Aruna Kuna Karly Wortmann Avril De Guzman	Closing script
6:30-6:40 PM	Clean-up	Karly Wortmann, Avril De Guzman and Aruna Kuna	

APPENDIX C

OBSERVATION MATRICES

Table 3. Observation Grid: Psychomotor outcomes during testing and reviewing Snapz Pro X recording.

Test Objectives	Observation Guidelines	Observations
Ease of use	Record if participant hesitates to begin using the software. Did the participants start by reading the Users' Guide or delve straight into the software? Count the number of times the participant stopped the activity (looking for help does not count as stopping).	
Writing quizzes	None – quizzes were prepared to meet Ames Middle School 7th and 8th grade Mathematics standards	
Creating quizzes	Note if the participants have trouble removing multiple choice question answers. Note if the participants have trouble adding multiple choice question answers. Note if the participants hesitated when they added new questions of the proper question type. Note number of times participants went to the users' guide for help.	
Packaging custom Quizzes	Was the quiz saved in the proper location?	

Table 4. Observation Grid: Affective outcomes gathered during the focus group.

Test Objectives	Observation Guidelines	Observations
Teachers were satisfied	As a response to the focus group, what were the satisfaction ratings from using the software?	
Value of software	Did the participants respond to a foreseen value of the software used as a review tool in their classrooms?	
Pros and cons of the software	Gather pros from focus group. Gather cons from focus group.	
Awareness of educational software for iPods	Were the participants aware of any educational software for iPods? Were participants aware of iQuiz Maker? Were participants willing to promote the software to their colleagues?	

APPENDIX D

SEVENTH AND EIGHTH GRADE MATH QUIZZES

Quiz Questions following 7th grade standards at Ames Middle School (Ames, IA):

Answers are identified in **bold**.

Standard 7G1:

1. What is the perimeter of an equilateral hexagon with a side of 4?
a. 18
b. 24
c. 28

Standard 7N3:

2. What is 20% of 125?
a. 15
b. 25
c. 35
d. 45
e. 55

Standard 7A1:

3. The next number in this pattern would be 256. 1, 2, 4, 8, 16, 32, 64, …
False

Feedback: The pattern of numbers doubles with each consecutive number. If 64 were to double, it would be 128. Then, 128 doubled would be 256. Therefore, 256 is incorrect.

Standard 7G3:

4. If two angles in a triangle are 50 degrees and 40 degrees, what is the measurement of the third angle?
a. 10 degrees
b. 90 degrees
c. 135 degrees
d. 180 degrees

Quiz Questions following 8th grade standards at Ames Middle School (Ames, IA):

Answers are identified in **bold**.

Standard 8A1:

1. Find the algebraic equation that matches this problem: If a man were growing apples in an orchard and it took 2 apples to feed 1 man. How many apples would it take to feed 150 men?
a. 0.5(150) = x
b. 2(150) = x
c. 20(150) = x

Standard 8G2:

2. Which of the following is the area of a triangle?
a. L x w
b. L x w x h
c. 0.5 (l x w)
d. 2r
e. count the squares inside the triangle on the graph paper

Standard 8G1:

3. The length of a football field could be measured in
a. Grams
b. acres
c. Kilometers
d. Milliliters

Standard 8D1:

4. The mean of the following set of data is 8. 2, 4, 6, 6, 8, 10
False

Feedback: The mean is the average of the data set (6). The mode is the number found most often in the data (6). The median is the number that found in the center of the data set (6).

APPENDIX E

FOCUS GROUP GUIDE

Total Participant time required: 1 hour 30 min (pilot test)

Total focus group time: **20-25 min**

Break: 0 min

OVERALL QUESTION TO ANSWER IN FOCUS GROUP DISCUSSIONS:

The purpose of the study is to conduct evaluative research to determine:

- whether or not iQuiz Maker is usable
- whether or not middle-school mathematics teachers would be willing to use iQuiz Maker as a classroom review tool after experiencing it

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Before the group begins, conduct the informed consent process, including compensation discussion.

I. Introduction (2 min)

- Welcome participants and introduce yourself.
- Explain the general purpose of the discussion and why the participants were chosen.
- Explain the presence and purpose of recording equipment and introduce observers.
- Outline general ground rules and discussion guidelines such as the importance of everyone speaking up, talking one at a time, and being prepared for the moderator to interrupt to assure that all the topics can be covered.
- Inform the group that information discussed is going to be analyzed as a whole and that participants' names will not be used in any analysis of the discussion.

This study is intended to clarify the experiences of middle school teachers about iQuiz Maker as well elicit their ideas related to the software's usefulness in their work.

Discussion Guidelines (Avril):

We would like the discussion to be informal, so there is no need to wait for us to call on you to respond. In fact, we encourage you to respond directly to the comments other people make. If you do not understand a question, please let us know. We are here to ask questions, listen, and make sure everyone has a chance to share. As discussed, we will be tape recording the discussion, because we do not want to miss any of your comments. No one outside of this room will have access to these recordings and they will be destroyed after our report is written. Helping are Karly and Aruna. They will be taking notes and be here to assist me if I need any help.

II. Focus group (15-25 min)

The focus group facilitator will explain:

We are here because you have had the chance to experience creating a quiz for iPods using iQuiz Maker software. We would like to learn about your experiences, feedback and whether or not you think the software would be useful in your work as middle school mathematics teachers. **Let's get started!**

Question 1-2:

Overall, are you satisfied with iQuiz Maker? Why or why not?

On a scale of 1-5, 1 being difficult to use and 5 being easy, rate the ease of use of iQuiz Maker. Why?

Let each participant answer the question. Take notes (voice recording catching any other answers).

Question 3-5:

Do you foresee iQuiz Maker helping your students learn? Why or why not?

Presuming you have access to a computer with iQuiz Maker and iPods, what are the pros of using iQuiz Maker?

What are the cons of using iQuiz Maker?

When you went to the users' guide for help, did you get the help you needed?

Let each participant answer the question. Take notes.

Question 6-8:

Before this test, were you aware of any educational software to be used on iPods?

Of iQuiz Maker?

Would you suggest this software to your colleagues?

Let each participant answer the question. Take notes.

V. Closing (2 min)

- Closing remarks
- Thank the participants
- Issue their compensation if available

APPENDIX F

INTRODUCTION SCRIPT

Hi, thank you very much for coming and welcome to the usability test. We are iQuizzlers. I am Karly and this is Avril and Aruna. Today we are here to test how easy it is to use a particular piece of software, which may be useful for creating quizzes for your students.

With this software today you all will be performing some typical tasks and we would like you all to perform as you normally would. Do not be too concerned about your results, do your best.

This activity will be divided into two parts. During the first part, you will be creating a Mathematics quiz on iQuiz Maker using a questionnaire we designed based on Ames Middle School mathematics standards. During the session, you may refer to the users' guide located under the help menu. Since this activity is for testing usability of software, we encourage you to work independently. This part should take at most 35 minutes.

After that, we will take a 10-minute break before starting the second part of the activity – a focus group discussion. During the focus group, we will ask you questions related to your experience with iQuiz Maker as well as solicit your views and opinions regarding the software. The focus group should take about 25 minutes.

During the activity, the team will be around to facilitate, take notes and operate the video equipment. On your computer, a screencapture software will record the entire quiz creation process.

We are not affiliated with Aspyr, the designers of the software, and this activity is conducted only for research purposes. We will not be collecting background information from you; your participation is voluntary and you may opt out from the test at any time. Do you have any questions?

If not, we are now passing out a consent form. Please read it through and sign it. Thank you for your willingness to participate!

APPENDIX G

INFORMED CONSENT DOCUMENT

Title of Study: EFFECTIVE QUIZ MAKING: EVALUATING iQUIZ MAKER

Principal Investigators:

Avril B. De Guzman, Graduate Student

Karly Wortmann, Graduate Student

Aruna Sai Kuna, Graduate Student

This is an evaluation study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to test the usability of iQuiz Maker. You are being invited to participate in this study because you are a mathematics teacher at Ames Middle School

DESCRIPTION OF PROCEDURES

If you agree to participate in this study, your participation will last for approximately 1 hour and 35 minutes. You may skip answering any questions that you do not wish to answer or that make you feel uncomfortable. During the study you may expect the following study procedures to be followed:

1. You will be asked to create a quiz using iQuiz Maker.
2. Then, you will be asked to participate in a focus group discussion about your experience of the software.

RISKS

While participating in this study you may experience the following risks: Slight emotional or mental discomfort due to learning new software.

BENEFITS

If you decide to participate in this study there are no direct benefits to you. It is hoped that the information gained in this study will benefit society by gaining knowledge on the usability of educational software such as iQuiz Maker.

COSTS AND COMPENSATION

Aside from your time, you will not have any costs from participating in this study.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken: participants will be assigned a unique ID number. Names and verification numbers will not be collected in this study. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study.

- For further information about the study contact Karly Wortmann at karlyw@iastate.edu or 515-294-4406.
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office of Research Assurances, Iowa State University, Ames, Iowa 50011.

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PARTICIPANT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document and that your questions have been satisfactorily answered. You will receive a copy of the written informed consent prior to your participation in the study.

Participant's Name (printed) _____

_____ _____

(Participant's Signature) (Date)

INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

_____ _____

(Signature of Person Obtaining (Date)

Informed Consent)