National Cancer Institute

**A Study to Determine the Suitability and Usability
of a Tool to Create Online Interactive Training**

Innovation for Health

Usability Study Findings

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**Conducted under contract by
User-Centered Design**

For the

**National Cancer Institute's Office of
Market Research and Evaluation**

October 2010

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Executive Summary

The National Cancer Institute (NCI) is developing an interactive, online tool called Innovation for Health. It consists of a training program that provides community clinic staff with training on a range of health topics and an authoring tool that allows staff trainers to create custom content for their trainees. User-Centered Design was asked to conduct a usability test on the authoring side of the tool. The objectives were to determine the suitability of the tool as a whole (would it be a useful training tool, does it contain appropriate features, etc.) and the usability of the authoring tool in particular. Though participants were shown a demo of the training portion of the tool to help them understand the context, they were not asked to evaluate the training portion.

Seven individuals participated in the usability study. The first two sessions were conducted in person at the NCI's Office of Market Research and Evaluation (OMRE) User-Centered Informatics Research Lab. The remaining five were conducted remotely using the screen sharing software, GoToMeeting. Each session lasted about an hour. An interrupted task based protocol was used.

Overall, participants liked the concept of the tool. In particular, they liked that it was interactive. However, when creating stories it was clear that they did not understand how stories fit together into playlists. Participants had difficulties at both the macro and micro levels. They had trouble forming a conceptual model of the process needed to create a package of training material. This was due to both the terminology used within the tool and the workflow. At the individual function and screen level, screen layout and labeling were the biggest issues.

Though this report provides some specific recommendations on how to improve the current tool design, it is unclear that that these fixes will be sufficient to complete this tool. As it is currently designed, it is unlikely to meet the needs of its intended audience in terms of functional suitability. It has some good baseline functionality. However, to make it truly useful and usable, more flexibility, a better workflow, and possibly additional features will be required. Additional discussions with people who are experienced at developing training are recommended to ensure the functionality the users need is incorporated into the tool.

Introduction

Product Description

The National Cancer Institute (NCI) is developing an interactive, online tool called Innovation for Health. It consists of a training program that provides community clinic staff with training on a range of health topics and an authoring tool that allows staff trainers to create custom content for their trainees.

Five types of training modules, called "stories," can be accessed through the training tool: Activity, Stand Alone Video, Vignette, To Tell The Truth, and Text Multiple Choice questions. The Activity type of story is a pre-existing interactive training activity developed by the NCI. Activities tend to use sophisticated interactions, such as moving things around on the screen with a mouse. This is the only story that cannot be created through the authoring tool. A Stand Alone Video is a single scene with one to three animated characters talking. A Vignette starts like a Stand Alone Video, but it is followed by a multiple choice question related to the scene presented. A To Tell The Truth consists of three scenes, each with one person talking; followed by a multiple choice question related to the scenes (e.g. which person is telling the truth). A Text Multiple Choice is simply a multiple choice question presented on its own.

When creating animated scenes, users (the staff trainers) can set the location, choose the characters and their voices, and write their own dialog. The software then converts the text dialog to audio and has the characters speak it. Stories can be put together to form a "playlist" which is the equivalent of a training session on a particular topic.

It is intended that users will not only be able to create their own training material, but will be able to share it with other users as well.

Test Objectives

User-Centered Design was asked to conduct a usability test on the authoring side of the tool. The objectives were to determine the suitability of the tool as a whole (would it be a useful training tool, does it contain appropriate features, etc.) and the usability of the authoring tool in particular. Though participants were shown a demo of the training portion of the tool to help them understand the context, they were not asked to evaluate it.

Test Design

Participants

Seven individuals participated in the usability study. All participants were staff members in charge of training other staff members; all worked in a community clinic, except for one who worked in a small community hospital. As part of their job, some also trained patients. All had either a bachelor's or post graduate degree.

Methodology

The first two tests were conducted in person at the NCI's Office of Market Research and Evaluation (OMRE) User-Centered Informatics Research Lab. The remaining five were conducted remotely using the screen sharing software, GoToMeeting. Each session lasted about an hour. An interrupted task based protocol was used in which participants were given a task to perform and were allowed to work on their own. If anything of interest to the facilitator occurred (e.g. a comment, gesture, change in facial expression, or overt action or behavior), the facilitator would interrupt the participant at that moment to investigate what had happened.

Participants were first shown a demo of the training portion of the tool to provide them with context for using the authoring portion of the tool. They were shown examples of each of the main story types (a Vignette, To Tell The Truth, and a Text Multiple Choice) to see what the final output would look like.

Within the study participants created Vignettes, To Tell The Truth, and Text Multiple Choice questions. Depending on how long it took participants, they completed either one or two of the story types. None of the participants had time to create all three. The focus was primarily on the Vignette and To Tell The Truth because those both contain a multiple choice question.

The Stand Alone Videos were not shown to participants, however, it was discussed how these might be incorporated into training.

If participants had a particular training scenario in mind that they wanted to try, they were allowed to create their own stories from scratch. Otherwise they were provided with pre-written tasks. Most participants chose to use their own training material because it was familiar to them. This also helped them to better determine the suitability of the tool for their work.

Test Results

Overall, participants liked the concept of the tool. In particular, they liked that it was interactive. However, when creating stories it was clear that they did not quite understand how stories fit together into playlists. Participants had difficulties at both the macro and micro levels. They had trouble forming a conceptual model of the process needed to create a package of training material. This was due to both the terminology used within the tool and the workflow. At the individual function and screen level, screen layout and labeling were the biggest issues.

Suitability

Participants were asked to describe the type of training they currently conduct. They described it as either being done in small groups or one-on-one with the trainee. These approaches allow the trainees to take an active role in learning by discussing and asking questions. Often, activities such as group discussions, role-playing, guest speakers, and reading material were mentioned as types of training activities. Some participants said they gave tests or evaluations as well.

The animated scenarios in the tool could potentially be an alternative to the reading material, though they provide only one-way interaction. The user cannot ask questions to probe further and learn more. Some participants recognized this. As it stands, the tool would be a good way for trainees to perform self assessments to see if they retained what they previously learned. In this way, the tool becomes one piece of the training process.

Some participants believed the tool could provide training (rather than just an assessment), but they would use it in conjunction with other types of in-person training. If this tool is to be used for training and not testing, it needs to include the ability to add other types of training material. For example, some things are better explained in text than with animated video. Perhaps a trainer would like to upload presentation "slides" that they have already created so they would not be forced to recreate them as a video. Additionally, it would be nice to be able to present information on a variety of topics, followed by a series of follow up questions. Currently only one question can be associated with a single story video (i.e. Vignette or To Tell The Truth).

Usability

Homepage

The homepage of a website should clearly convey to users the purpose of the site. It should contain useful information and links that get users to more detailed information on the site. In this case, the homepage does not fulfill these goals (*see Figure 1*). There is nothing on the page that explains what Innovation for Health is. The image used may be visually appealing, but it does not convey that this is a training tool. Further, the NCI News Releases on the home page only serve as a distraction to users, directing them away from this site. Consider removing the news releases and adding introductory text to the homepage that lets users know the purpose of the site.
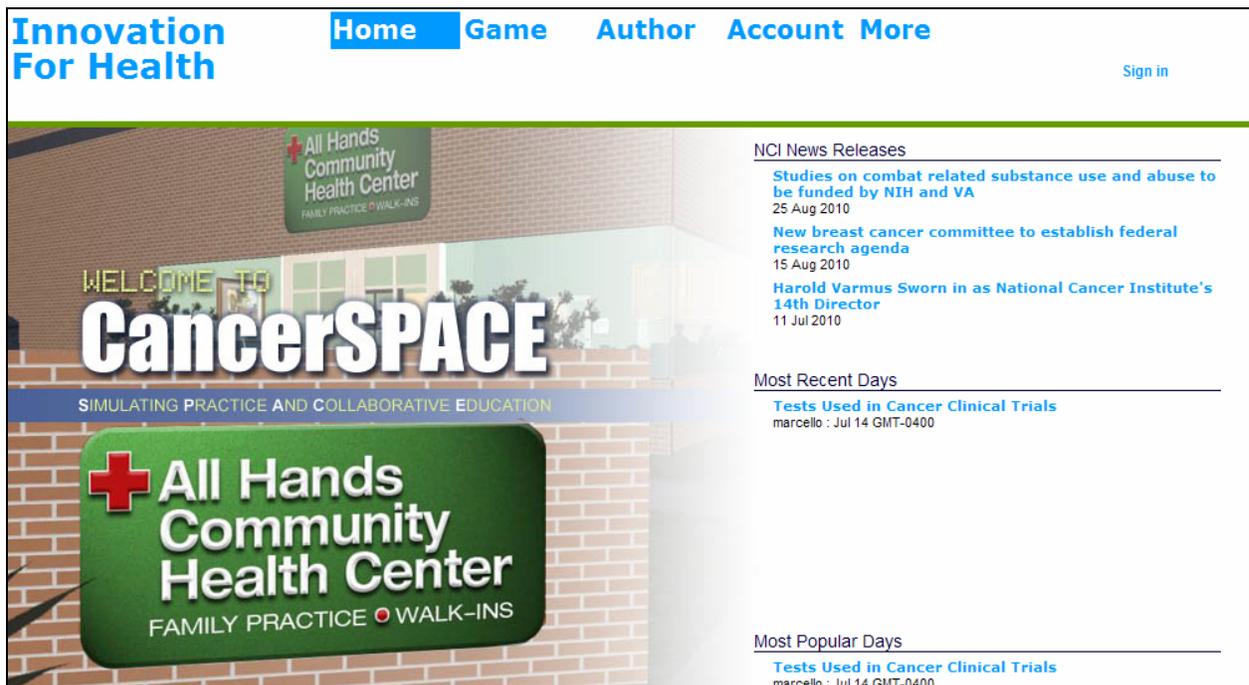
Figure 1: The homepage of Innovation for Health does not convey the purpose of the site.

Conceptual Model & Labels

Within the tool, there are two levels that make up the training material. Stories are the micro level - individual training modules that can be put together to form a playlist, or macro level, of related training material. During the usability test and before exposing participants to the labels that the tool uses, participants were asked what they would call the different levels of training. They gave a variety of answers for the equivalent of the playlist including "course," "lesson," "session," and "class." They referred to stories (or the smallest piece of training) as "modules" and "topics." Participants unanimously agreed that the terms stories and playlists did not fit into their conceptual model of what training is.

Any of the labels that were suggested for the equivalent of playlist could make sense in this setting. Though participants had fewer ideas for what to call a story, the label "modules" was used in conversation during the usability test and this seemed to make sense to participants.

Labels used throughout the site to refer to the training tool and the authoring tool were "Game" and "Author." Again, these labels did not make sense to the participants. Game (the second item in the primary navigation – see Figure 1 above) refers to the training application itself – the piece trainees would use. Though the label Game was likely used in an attempt to make the training more approachable, participants did not think of training as a game and thus it did not resonate with them. Changing the label to "Training" would be more straightforward and better understood by users. Author (the third item in the primary navigation) is used as a verb in the sense that one would author (i.e., create) a training module. When participants saw Author they thought it would provide information on the author/creator of the tool. Again, they did not relate it to training. Changing the label to "Create Courses" (or whichever label is used to indicate playlists) would clarify this.

Navigation Menu

The navigation menu is arranged so that clicking on Game, Author, or Account results in the sub-menu being displayed horizontally beneath the primary menu (*see Figure 2*); nothing else on the screen changes. This confused some users because they were expecting to go to a new page when they clicked one of the links. Some participants did not initially notice that the sub-menu had appeared. This situation can lead to further confusion when a user is in one section (e.g., Author) and clicks on another section (e.g., Game). In this case, the sub-menu for Game will be visible but the user will still be in the Author section. As a consequence, the positional feedback that lets the user know where they are is lost.

A more standard approach to this menu structure would be to have the sub-menu appear vertically beneath the parent category when the user hovers over it. This removes the confusion of clicking a link and not going to a new page. This also allows the user to view the menu of another section without losing the positional feedback (i.e., blue background color) from the section they are currently in.
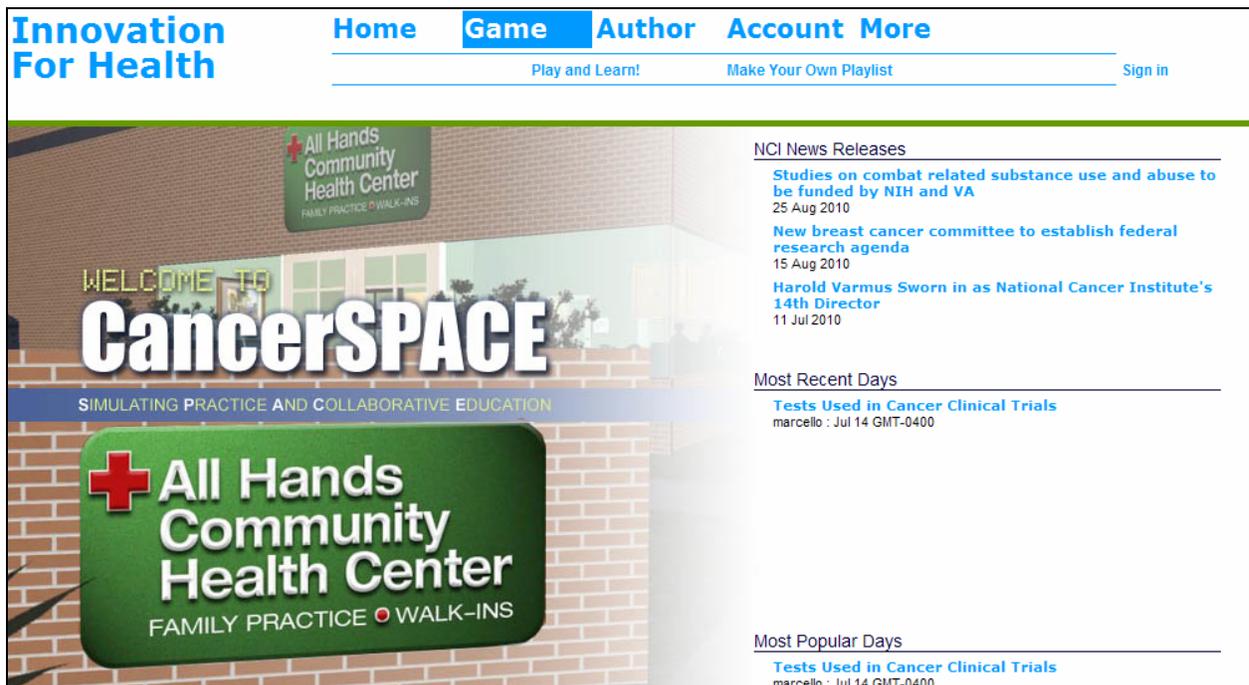
Figure 2: The main navigation did not work as participants expected. When a menu item was clicked, the horizontal sub-menu and lack of change within the main body led to confusion.

Playlists

Initially, participants did not understand the term "playlist." However, once the concept was explained (that one can create stories and group them together into a playlist) it seemed to make sense. Currently there is a menu option to "Make Your Own Playlist" (*see Figure 3*). However, the only functionality provided on that page is to add and remove already created playlists to the game. In order to actually make a playlist the user needs to go to the Author section and select "Make new Stories for Your Playlist" (*see Figure 4*). From there new stories can be added to form a complete playlist, which could then be saved and later added to the game.

The current process for creating a playlist does not allow for much flexibility. It requires that the user knows exactly what to add to the playlist and in what order. There is no way to move stories within the playlist or from one playlist to another. Additionally, it separates the adding of the playlist to the game from the creation of it (i.e., one adds it to the game from within the Game section but creates it from within the Author section).

An alternative to this workflow would be to separate the creation of stories from the creation of a playlist. Users could create and edit individual stories, then in a separate step add stories to a playlist, order, and re-order them freely, and finally add the playlist to the game. In this way a single story could be used in multiple playlists.

Figure 3: The label, "Make Your Own Playlist," does not match the functionality provided.

Figure 4: "Make new Stories for Your Playlist" combines the process of creating stories and the playlist together. This limits the flexibility of the system.

Story Types

There are four types of stories that a user can create: Text Multiple Choice, To Tell The Truth, Vignette, and Stand Alone Video. Text Multiple Choice and Stand Alone Video are fairly self explanatory, unlike To Tell The Truth and Vignette. To Tell The Truth is a name based on a game show, and if one is familiar with the show then it makes sense. However, not all participants were familiar with it. Though participants could often guess at how the labels matched up to the different story types, it was not always immediately obvious. Additionally, some participants suggested using To Tell The Truth in ways other than having the trainee choose who was telling the truth. For these reasons, it might make more sense to call these story types by a more descriptive label, for example, "Group Dialog," "3 Individual Speakers," "Single Scenario," "Three scenarios," etc.

Produce Your Own Video

When participants were asked how they would get started creating their own training on this site, they almost always started with "Produce Your Own Video" (*see Figure 5*). For them the animated scenarios were videos and they wanted to make their own, so the label seemed to fit perfectly. This option, however, is really intended to be used as a demo. It allows unregistered users to go through the process of creating a scenario to try it out before registering. The process does not allow the user to save anything. Participants did not see the value in this option. They felt that if they went to the trouble of creating something, they would want to be able to save it. Additionally, since it costs nothing for a user to register for an account, demoing only a small portion of the tool adds little value.

An alternate approach would be to remove this option from the menu and create a video tutorial that shows users the complete functionality of the tool. Linking to this tutorial on the homepage would draw in new users to show them the tool's capability. That would serve as a" hook" so they would register to try it out for themselves.
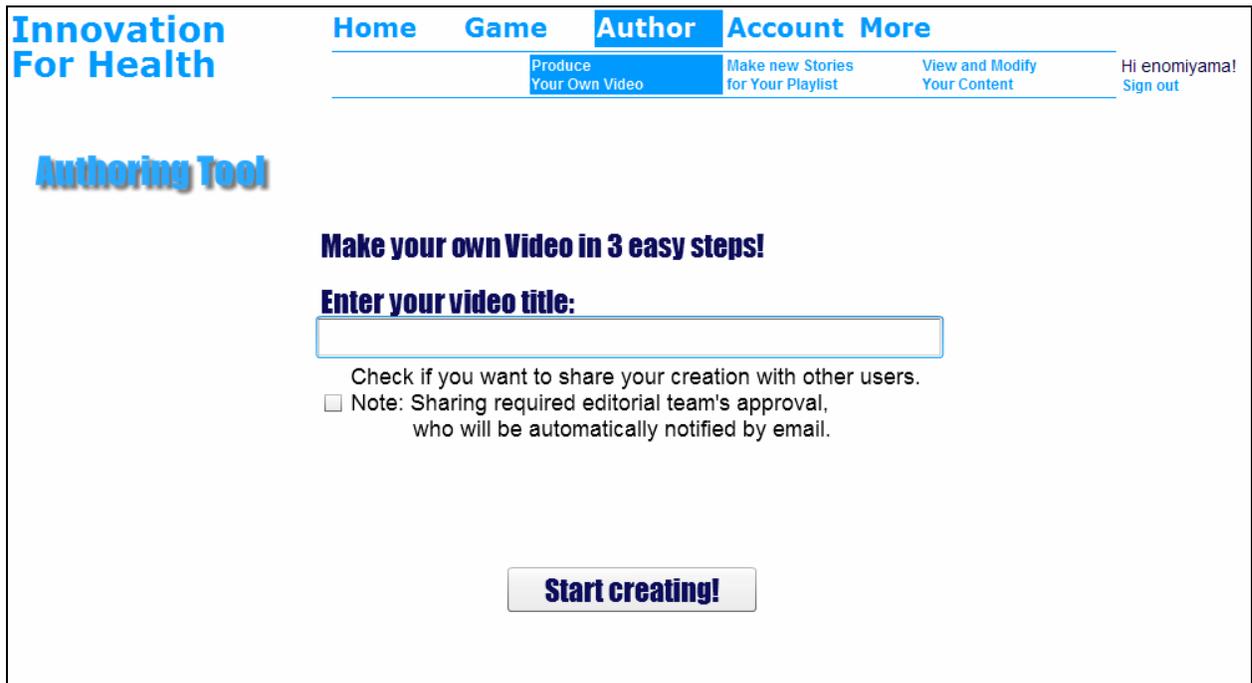
Figure 5: The "Produce Your Own Video" label is misleading.

Active Fields

When creating a new story, the first field on the page, "Enter your playlist title," has a blinking cursor in the text box (*see Figure 6*). Usually this indicates that this is the active field and typing will show up there. However, when participants started typing nothing happened. It was necessary to first click in the box to activate it. Best practice is that if a field is not active, it should not have the cursor in it.

Sharing a Story

When creating a story, the first screen asks users if they want to share their creation with other users (*see Figure 6*). Participants always skipped over this text. In terms of workflow, this does not seem the appropriate place for users to decide whether or not they want to share their story. After having created the story users would be in a better position to decide if they want to share their work. Also note that the current system lets users share individual stories, but it might also be useful to allow users to share entire playlists.

Entering Your Email

When creating a new story, the first page asks the user to enter their email address but it is pre-populated with the email address that was used for logging in (*see Figure 6*). This is an unnecessary step since the system already knows the user's email address. Removing this step would streamline the process.

Figure 6: The first screen of the "Make new Stories" section.

Health Topics

When creating a story, the user is required to select a health topic for that individual story. While this may be useful, participants in the usability test talked about topics on a larger scale. For example, the entire training course might be about a particular health topic, but within the topic there would be several more specific "sub-topics." In the test, many participants selected the "other" option because the listed health topics did not match their topic idea. A useful addition would be to add a text field if "other" is selected so users can name the topic more specifically. It might also be worth considering allowing a monitored way for users to add to the "acceptable" list of health topics.

Additionally, as the list of health topics grows, the list-box that is used to display them will become cumbersome since it only shows three to four options at a time (*see Figure 7A*). The use of a drop-down menu instead would make it easier to scan the list and select an option.

Figure 7: A: The use of a list-box to select a health topic will become cumbersome as the number of topics increases. B: The placement of the evidence upload functionality in the workflow and lack of "instructions" led to participants missing it.

Evidence

A key component of the training tool is the ability to provide evidence to support the correct answer when asking trainees a question. This component seems to be downplayed in the interface. First, it is optional. By making it optional, trainees may miss the opportunity of that additional information being provided. In addition, all participants in the study skipped over the section where evidence is added (*see Figure 7B*). None of them even mentioned it, though they were shown such evidence in the demo. There could be several reasons for this. Participants might not have noticed it, they might not have known what it was and thus ignored it, or they might have simply skipped it because it is optional.

Consider making the evidence upload feature its own required step in the process of creating a story. Brief instructions could be given to explain why the user would want to upload evidence. Since the evidence is dependent on what the question is, its placement in the workflow should come directly after the question is created.

Horizontal Scrolling

Both the location and character selection is handled by use of a "pop-up" that requires the use of horizontal scrolling to view all options (*see Figure 8*). Most participants did not notice the horizontal scroll bar. There are several contributions to this oversight. First, horizontal scrolling is not common and therefore users do not look for it. Secondly, the display shows three full rooms and so there is nothing prompting users to look further.

Several solutions could be used to address this issue, depending on the final design of the tool. One approach, using the current design, would be to resize the images so the last one that is visible when the page loads is cut off, prompting users to scroll. Another approach would be to list the characters/locations in a vertical list of radio buttons, displaying the currently selected option to the right (*see Figure 9*). This would allow users to see the full list of options available to them, though they would only be able to see one image at a time.
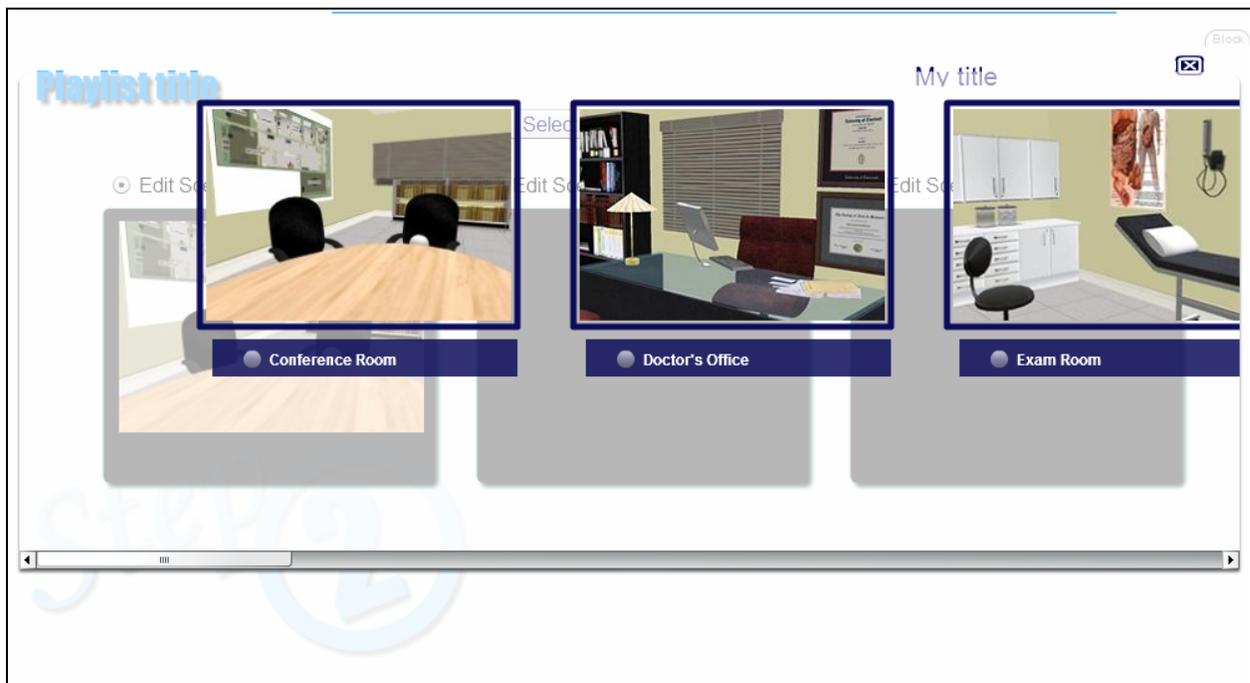
Figure 8: The location selection pop-up requires horizontal scrolling which participants did not notice.
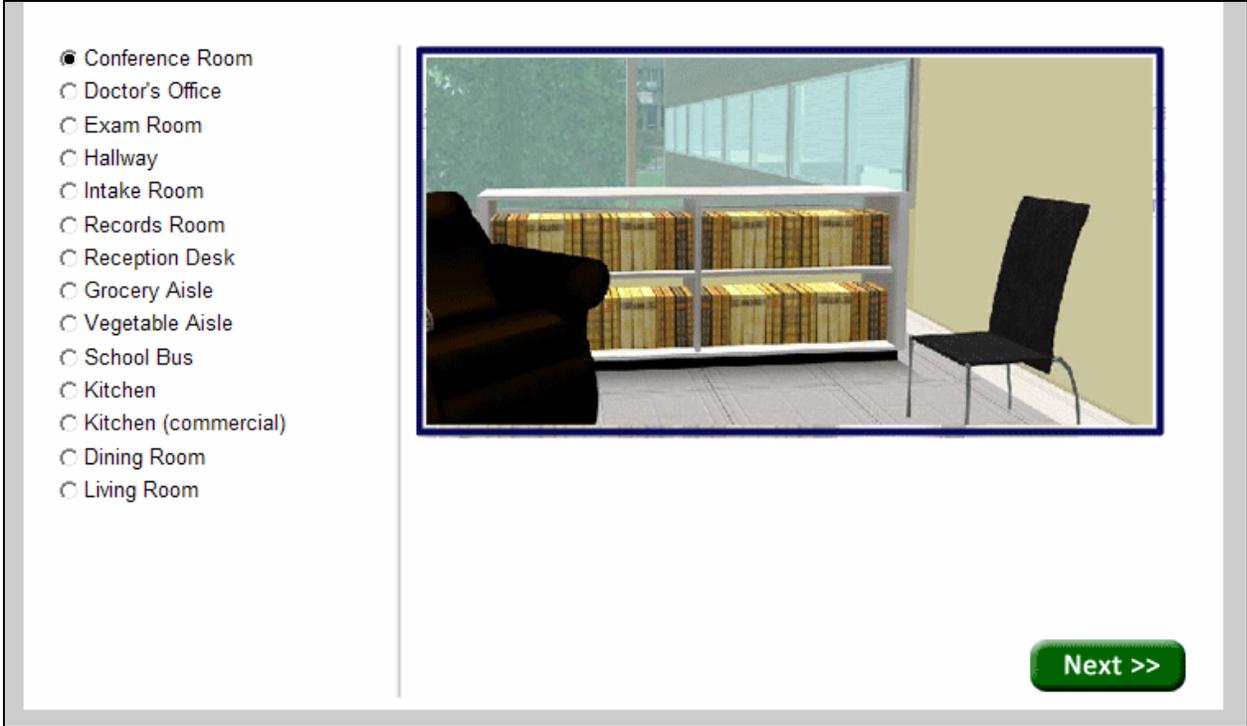
Figure 9: A possible alternative to the way to select a location (or character).

To Tell The Truth Scene Creation

When creating a To Tell The Truth story the user needs to select a location, a character and its voice, and enter dialog for three different scenes (*see Figure 10*). In the current design, this all happens on one screen. This caused participants to hesitate as they tried to determine what to do next; too many options were available. Thus, participants would often leave out something (e.g. they would forget to select a voice or a character for a scene). In addition, they would sometimes have one scene selected but would try to edit the location or character for a different scene. Breaking up the workflow so that users select the location and character for a single scene at a time would decrease the number of decisions and help clarify the next step to take.
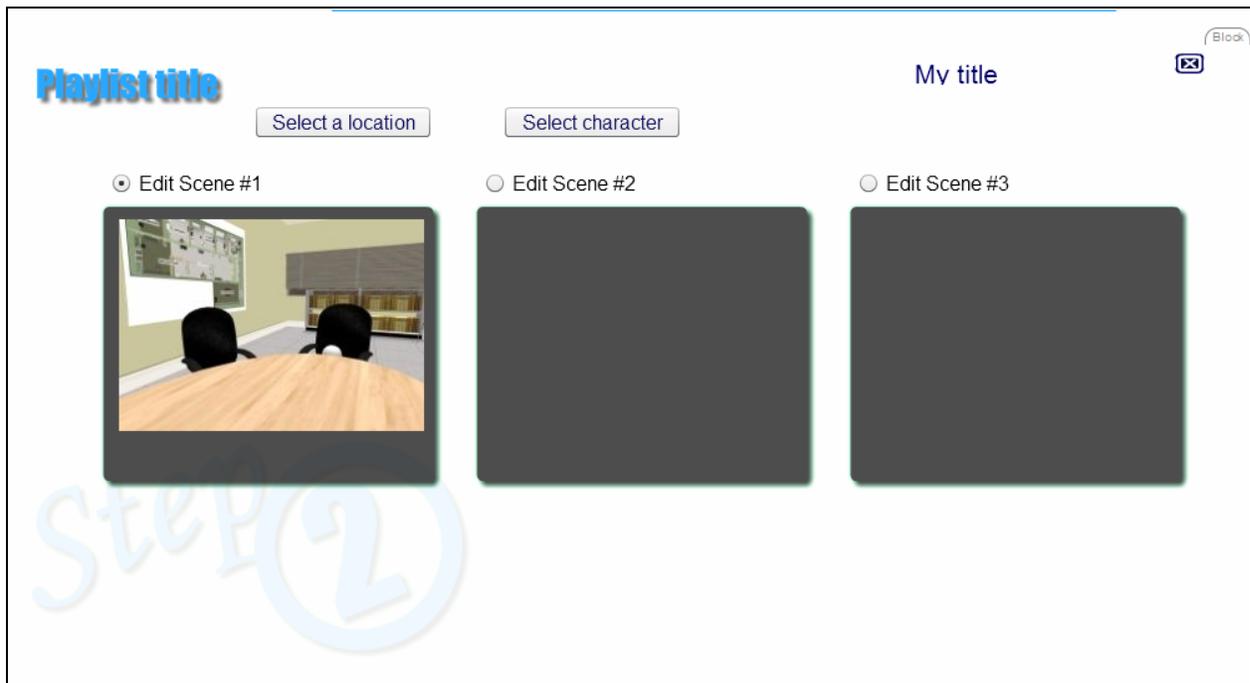

Figure 10: The number of things the user has to do on this page (and the order in which they could do it) caused confusion and hesitation among participants.

Voice Selection

Participants had a lot of trouble selecting voices for characters (*see Figure 11*). First, the default selection, "Voice #1," appeared to be a valid voice option so by default many participants did not change it. However, the label was intended to be a placeholder (i.e., make a selection for voice 1), not an option. If the user did not select a voice from the list, an error was given. Once participants figured out they needed to select a voice, they were confused by the fact that the names in the list did not match up with the character they had selected. For example, in Figure 11 the character in Scene #3 is Anna, but the voice options are Allison and Susan. A common question from participants was "why would Anna have Allison's voice?"

There are several ways to address this issue. Each character could be given its own voice so that users would not need to select a voice at all. This would be the most intuitive solution for users. Alternatively, instead of giving the voices human names, they could be called "Female Voice #1", "Male Voice #2", etc. The default option would then be "—select a voice—". This would help users recognize that they need to make a choice and would ensure there is no confusion between character name and voice name.
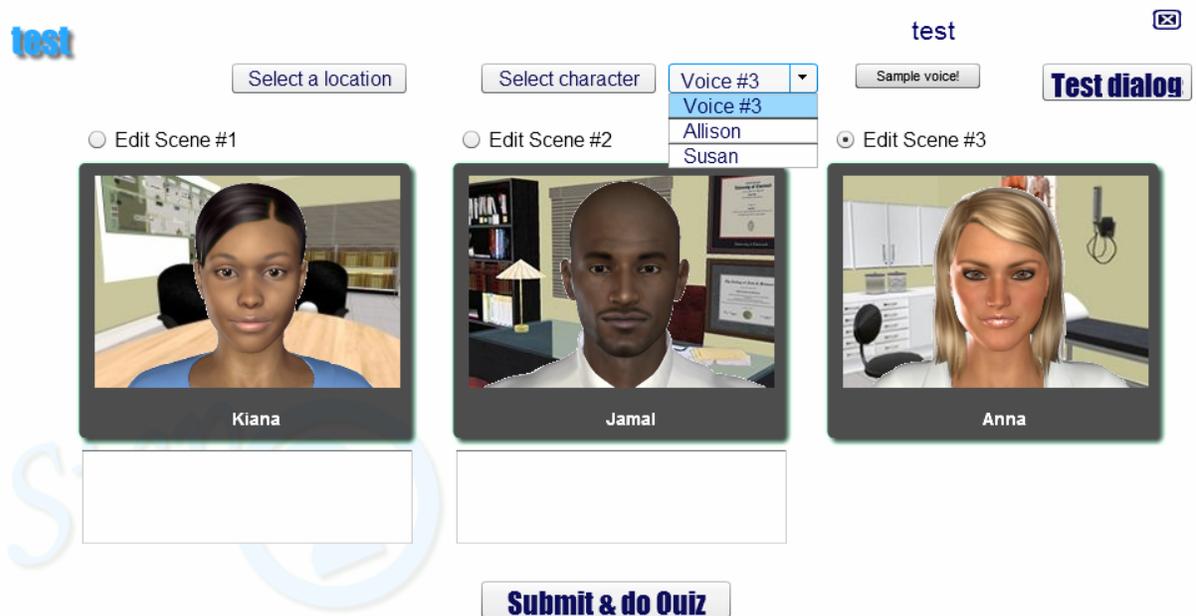
Figure 11: The voice selection caused a lot of problems for participants.

To Tell The Truth Character Dialog

Participants often missed the dialog box that shows up underneath each scene after making a voice selection for a character (*see Figure 11*). Visually the boxes are hard to see because they are white boxes on a white background. Participants often clicked Submit before entering any dialog and then tried to enter the dialog on the Question Creation page.

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Several things can be done to draw attention to the dialog creation step. First, dialog creation could have its own step/screen. After the user chooses locations and characters *then* a new page would allow the user to enter the dialog. This would help users to know the order in which to do the steps. Additionally, putting default text in the dialog box (e.g., –enter dialog here–) would draw attention to the fact that it is a text box. That default text would disappear when the user clicks in the box. The text could alternatively be provided as a label for the box, rather than as text inside the box.

Vignette Scene Creation

When creating a vignette in the tool, selecting the location, characters, and dialog all happen progressively on the same screen. Though the page starts off with only the option to select the location, the character selection is then added to the same screen, and once the characters are selected, the dialog box is added. The user can then edit the location, characters, and dialog all on the same screen at any point. Again, this led to an overwhelming interface with too many options (*see Figure 12*). Though participants only wanted to edit the dialog, there were two sets of radio buttons available – one to select which character to edit and one to select which actor is speaking. They often got these mixed up and clicked the wrong radio button. As described above, breaking the workflow into distinct steps would lead users through the process more easily and clarify what they should be doing at each step.

Figure 12: The interface for creating a Vignette has too many options which are all available in the same step.

Vignette Dialog

The process of editing dialog confused participants. The "Edit dialog" button only shows up once the user has clicked on a line of dialog in the script box (*see Figure 13*), which participants usually did out of curiosity or by mistake, not because they realized it allowed them to edit the text. Once the button appeared, participants tried to click the button thinking that would launch a pop-up or new screen where they could edit the text. They did not realize that clicking a line of text populated it into the dialog text field (the same one they used to initially enter it) and there they had the opportunity to edit it and click "Edit dialog" to save it.

A more intuitive approach would be to put an edit button/link next to each line of dialog. Clicking the button would launch a pop-up in which users could then edit that line of text. Labeling the button as "Save", instead of "Edit dialog," would also better describe the action.
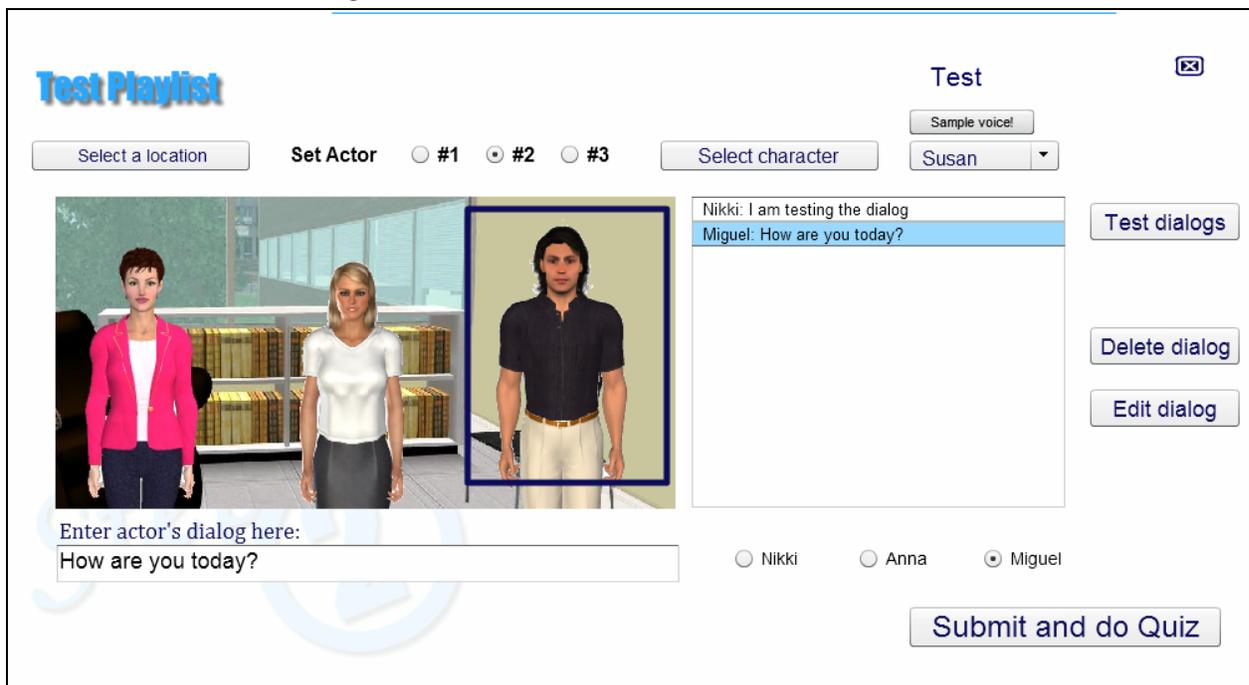
Figure 13: The editing process for the Vignette was not intuitive to participants.

Question Creation

Even by the time some participants got to the question creation step (*see Figure 14*) when making a Vignette or To Tell The Truth, they still did not have a conceptual model of what they were doing. Some participants did not realize the question was related to the scenario they had just built, and they started entering an unrelated question, thinking it was the next story in the set. Some participants, because the dialog boxes on the previous screen were not apparent to them, tried to enter the dialog in this step.

Overall, it was hard for participants to tell where in the process they were at any given point. Creating a step "timeline" that shows all of the steps and which one is current would help users understand what they are creating, what steps are involved, and what is left before finishing. Another way to provide context would be to display the scene(s) created above the question. This would also allow users to reference what they had written for the dialog as they are writing the question.

Figure 14: Question Creation screen.

Another problem some participants had when creating the question was in understanding what the "Answer's Feedback" field was for. Some participants thought it was the feedback the trainees would get if they answered correctly. Others thought it would be the feedback for an incorrect answer. They did not realize the feedback was given regardless of how the trainee answered. Once they were told this, some participants were fine with it, but some wanted to be able to enter feedback for each individual answer. They believed this was a chance to further enhance the learning experience by not only telling the trainee if an answer is right or wrong, but why. Since each answer will have a different reason why it is wrong or right, each answer would need to have its own feedback.

Finally, the "Good Answer" label confused many participants because the label led them to believe you could have several "good" answers. Since the system only allows one right answer, a better label would be "Correct Answer."

Previewing the Story

Once a user has created a Vignette or To Tell The Truth story, the preview only shows the preview of the question. It does not show a preview of the scene(s) created. Though participants did not comment on this, providing the full preview would not only give users the full experience, but would let them catch any mistakes in the dialog before submitting it.

Clicking Large Targets

In several places throughout the tool, users are required to select an option. When choosing a location or character, the image is displayed with a radio button above or below it (*refer back to Figure 8*). Participants would first try to click the image (instead of the radio button) to select an option because it was a larger target. The same thing occurred when users were selecting scenes to edit or the character for which they wanted to write dialog. If possible, consider allowing users to select options in the more intuitive manner of clicking on the item desired (as well as providing the radio buttons). This makes the tool easier to use since larger targets are easier and quicker to click than smaller ones.

Moving Around

In the current design, once the user has finished a step in the process of creating a story and moved on, it is impossible to go back to a previous step. For example, if the user has created a scene and is now on the Question Creation page, they cannot use the back button to edit the dialog. If users do this, they lose all of their data. Many participants made this mistake. Users should be allowed to move freely between the different steps and edit information they have already entered, or at least be warned that they will lose their stories if they proceed.

Additionally, there is no way to save a partial story and come back to it later. The user can only save at the end. This requires users to create everything at once, which is often not how people work. The addition of Save and Cancel buttons on every screen would give users more flexibility in how they create the stories.

Opening the "Game"

When a user clicks "Play and Learn" they are taken to a screen that tells them how to view the game in full screen mode, as well as how to close it and return to the site. The page automatically redirects the user to the game after a few seconds. A more elegant way to address the issue of the game needing to be in its own window would simply be to open it in a new window. The user can then resize the window to any size they like, including full screen. Additionally, they would still have access to the main site at the same time, if for some reason they needed it.

Conclusion

Though this report provides some specific recommendations on how to improve the current tool design, it is unclear that that these fixes will be sufficient to complete this tool. As it is currently designed, the tool is unlikely to meet the needs of its intended audience in terms of functional suitability. It has some good baseline functionality. However, to make it truly useful and usable, more flexibility, a better workflow, and possibly additional features will be required. Additional discussions with people who are experienced at developing training are recommended to ensure the functionality the users need is incorporated into the tool.