Mobile Storytelling

A guidebook for teaching students how to tell community-based mobile stories in the classroom

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INTRODUCTION

Introduction
Background

This guide was developed in response to the creation of the ARIS (Augmented Reality Interactive Storytelling) mobile story, "Getting a Job at Nikki's Place." This game was created by graduate students at the University of Central Florida during the 2014-2015 academic year. The game asks the player to go back in time to 1950s Orlando and experience life in Parramore in the shoes of Mr. Nick Aiken, owner of the restaurant, Nikki's Place. During the game, the players learn about the history of Parramore and about Mr. Aiken's life in the culinary arts by walking through Parramore using GPS location technology.

"Getting a Job at Nikki's Place" is geared toward 4th and 5th grade students from the Parramore area. Characters guide students through historic areas and sites. The goal is for students to have a newfound appreciation of their local history and the value of hard work and education.

What Is a Mobile Story?

A "mobile story" is a digital interactive story such as "Getting a Job at Nikki's Place," which we created using the ARIS mobile application developed at the University of Wisconsin-Madison. This app allows designers to use QR codes and/or GPS location technology to guide users through narrative games on mobile devices. "Mobile devices" are devices such as tablets and mobile phones.

Production

During this phase, students will use their storyboard to create a digital rendition of their game. Depending on the familiarity of the students with the technology, this can be the most time consuming phase of the project.

Post-Production

During this phase, students will test their game with outside users to ensure it works effectively and efficiently. Additionally, students will showcase their creation for their community.

We recognize this document provides a preview of how you could create a mobile story. It is not comprehensive. To help bridge any gaps in our documents, we have included numerous resources to assist in finding further information. A sample of activities and lesson ideas can be found on the sites listed in Appendix A. A selection of Florida State Standards for Social Studies grades 4-6 can be found in Appendix B. Further resources are available throughout the guide.

How to Use this Guide

This guide aims to provide educators with an overview of how to make a mobile story similar to "Getting a Job at Nikki's Place."

To help you, we have divided the process into four phases: **Planning**, **Pre-Production**, **Production**, and **Post-Production** (identified by color coding, as seen below).

Planning

During this phase, students and teachers will brainstorm the community topic they wish to explore, conduct research, and begin to plan the trajectory of their creation process.

Pre-Production

During phase, students will organize the story into a storyboard and gather the assets needed to complete the project.

PLANNING

Planning
Discovering the Story

The key to beginning any mobile story project is to first discover your story. The road to your story can take many different routes. You may already have a story in mind. If you don't, consider the following questions which might help guide you on the path to discovering your story.

Brainstorming

If you are starting at the very beginning, it can be beneficial to open a discussion with your students about their community. Take note of the things that are important to the students and see if you can discover a common thread or key narrative together.

Here are a few key questions to ask students to help begin brainstorming.

- Why do we tell stories about our community?
- Why is it important to learn about community history?
- What stories have you heard about your community?
- Is there anything you've always wanted to know about your community?

Sometimes, making the questions personal can be easier for students to answer. If your students have a difficult time answering the above questions, try asking them the questions below about stories from their families.

- Are there any generational stories from your family?
- Any stories that can be shared from your grandparents or other family members?

Be sure to document the brainstorming session. Have students write down their answers or create a web on the board to help link ideas and stories together. The goal of this brainstorming session is to encourage students to acknowledge, appreciate, and seek out stories from their community.

Another approach to brainstorming would be to use writing prompts. These can help students narrow their focus and gives everyone a chance to put their ideas out there. Some examples of Community-Based Writing Prompts appear on the following page.

- What I like about my neighborhood...
- If I could change one thing in my community it would be...
- Write about...a trip to the museum...
- Write about...a trip to a historical landmark...
- A good neighbor is someone who...
- Write about a special place you like to go in your community, outside of your home and school…
- Write about...places to volunteer...
- Write about...a community leader...
- Interview residents of a local retirement community…
- Write a story about your town for a kid who's just moved here...
- The best places to go in town are…

Conducting Interviews

The art of conducting interviews combines insights from the techniques of life history, oral history, and ethnographic research. The following section presents ideas for preparing for and conducting interviews drawn from Robert Atkinson (1998), Edward Ives (1980), and James Spradley (1979).

Some stories come from interviews with others, such as a family or community member. There are several ways to conduct an interview. You may interview one person at a time, or conduct a group interview. Group interviews allow the interviewees to interact with each other as well as with the interviewer. Additionally, an interview can be formal or informal. For formal interviews you arrive with a very specific list of questions you want answered. Informal interviews are more like conversations that cover a few broad areas you want the interviewee to address, but the way in which they choose to answer is left up to the interviewee(s).

While many dimensions of interviewing are flexible, there are a few basic criteria to follow

in selecting someone to interview. This person should be one with whom you have established enough rapport or trust to reasonably ensure a successful interview (one that yields a good amount of information); he or she should also be a currently practicing member of the cultural group you want to learn more about, and should be knowledgeable about the topic you want to research.

Before the Interview

It is important to conduct background research and prepare any questions for formal interviews before the interview process begins. Your
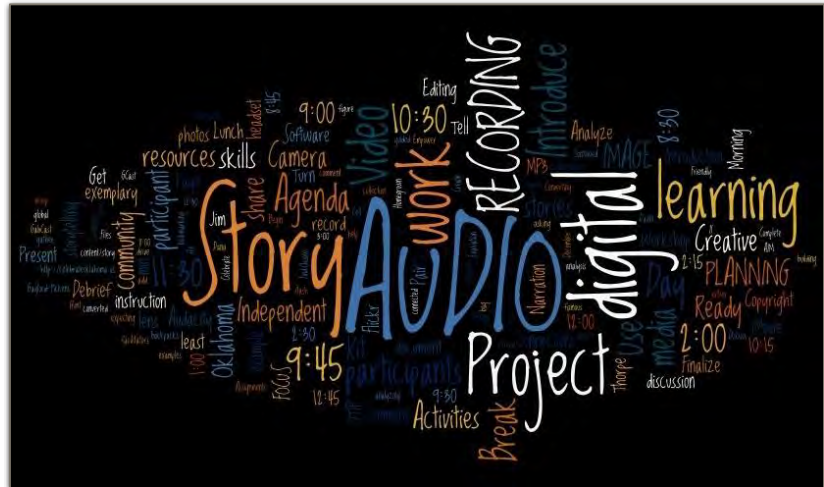
research will help you decide on the scope of your project, create manageable goals and locate potential interviewers to contact. You can also pre-screen the interviewees if you'd like and have time. Your background research will additionally help you identify what information you want to gain from the interview(s) and gain an understanding of the community.

There are numerous places to find research. Documentary resources such as books and articles, records in county courthouse, archives, old newspapers, maps, and informal collections by knowledgeable people are good places to seek information.

Be sure to have students familiarize themselves with the interview questions before they conduct the interviews. This will help them appear confident in their interviewing. And, don't hesitate to depart from the pre-formulated questions to pursue new directions that develop in the interview.

Contacting Interviewees

When you contact potential interviewees it will be important to explain clearly what you want:

- Identify yourself and your project
- Establish if s/he has the information you want
- Find out if s/he is willing and able to share
- Set a time and place for interview and get good directions

Screening your interviewee before the actual interview allows you to get an idea of his/her experience and knowledge. The best interviewees quickly understand what you're looking for and seem confident and alert. Be sure to reassure potential interviewees that you are not out to exploit, ridicule, or take advantage of them and that you won't misuse the information or make a profit from it.

In addition to these criteria for selecting an interviewee, keep in mind that there are certain requirements of you, too. Most importantly, you need to be able to clearly explain your research topic and your reasons for wanting to investigate it in clear and jargon-free English to your interviewees. Be honest—don't lie or misrepresent your intentions. Be yourself and don't pretend to know more about a topic than you really know. In addition, practice phrasing your explanation in a way you know that the interviewees will be able to understand and appreciate. You can also share some questions with the interviewee to help prepare and put him/her at ease.

The Interview

Before starting the interview, give the interviewee a consent form to review and sign. A sample consent form can be found in Appendix C.

Re-explain your project before beginning the interview. Record the interview unless asked to switch off the recorder. Don't record in secret. Ideal interviews happen in a relaxed setting.

Begin any audio or video recording with an introduction to record basic information. State the date, place of interview, name of interviewee, name of interviewer, and names of any others in the room including the name of the camera or recording operator if other than the interviewer.

Next ask basic biographical information: date and place of birth, early life history, and occupation. Or you might begin by asking a substantive question—one which goes to one of your main topics. Avoid asking painful or controversial questions at the beginning of the interview.

Asking Open-Ended Questions

Open-ended questions require more than a short answer. This means the answer isn't "yes" or "no." Explain to your students we are looking for people to give answers that explain something. Your interviewee(s) should do most of the talking. Ask "how," "when," and "why" questions. Avoid leading questions that suggest answers and multi-part questions.

Activity: Creating Sample Questions

When you conduct an interview, you're going to find that not all people are alike. If you ask, "Can you tell me about your experiences?", some people will talk for hours. All you do is sit back and record their words. Other people are less sure about how to tell their story, and need more prompts. Have students brainstorm a list of questions to bring to the interview to help your participant talk about his or her experiences, cultural knowledge, etc. Remind students that questions should be open-ended and pointed to the specific topic you want the interviewee to address. Share the questions as a class and begin to create a list of interview questions. Discuss with students how to move stories forward if an interviewee gets stuck.

Tips for Successful Interviews

Tolerate Silence: Be patient and give interviewees time to reflect before moving onto the next question. Accept that there will be short pauses when someone is answering a question, and give them room to tell stories.

Encourage with Silent Signals: Encourage with nods, smiles, and look attentive rather than using verbal responses like "yes" or "uh huh" that will be recorded. Tell your interviewee you are going to remain silent except when asking questions.

Be Attentive: Show that you have an inexhaustible interest in details and need everything explained. Be patient if being told what you already know—you are collecting this information for others who may not know.

Be Flexible: Don't be concerned with keeping to your sequence of questions, because memory doesn't work this way. Let interviewees tell their stories. Feel free to ask new questions on the fly.

Get the Best Information: If you feel you didn't get the answer to a question, ask again or use follow-up questions to clarify. Try asking for the same information in a different way or asking for more detail, specific examples, and for explanations of unfamiliar terms. Follow-up questions help elicit more details. Some examples might be: "When did this happen?" and "What are the steps in doing that?"

Take Notes: Take notes during the interview. These are supplementary to the recordings. Here you can write down gestures and facial expressions or reminders about things to follow up on later.

Use Photos or Other Documents: Old photos can be a good source of interest and stimulating memory. Ask interviewee(s) to show you photos, personal letters, or other important artifacts or mementos to encourage their memory and story-sharing.

Divide Interview into Sections: People get tired after 45 minutes to 2 hours of interviewing. Have several short interviews rather than one long one to improve the quality of the interview.

Ending the Interview: Be sure to ask, "Is there anything else I haven't covered or that you'd like to add?" and don't forget to say, "Thank you!"

Determining Your Audience

It is important to know who is going to view your story, so you can help your students create a mobile story that will best reach their audience. Sometimes your audience is obvious. Other times it isn't as clear. Below are some questions to consider when identifying your audience.

- Who is my target audience?
- What do I want my audience to take away from this project?
- How will my audience interact with my mobile story?
- Are there different types of people in my audience? How do I be respectful and understanding of multiple perspectives?

Reaching Your Audience

To reduce potential challenges, many game designers turn to User Experience (UX) and employ *user personas* and *scenarios* to help them better understand the players and design the best possible experience for them.

User personas are fictional descriptions of your audience. Personas are assigned names, photographs, motivations, goals, and believable backstories that are rooted in your audience's background. Usability.gov (www.usability.gov/how-to-and-tools/methods/personas.html) gives more information and includes some useful tools and examples for developing personas. *User scenarios* are stories that describe "a day in the life" of an audience member and explore how your mobile story fits into his/her life.

Many UX tools are outlined in the collection of UX techniques found on UXMastery.com (uxmastery.com/resources/techniques/). The UX Mastery website lists two helpful resources on developing user scenarios: Jacqueline Wechsler's introductory article, Using Scenarios (uxthink.wordpress.com/2010/11/30/using_scenarios/), and Neil Turner's Step by Step Guide to Scenario Mapping (www.uxforthemasses.com/scenario-mapping/)

Additionally, the following website has a wide array of useful UX tools and links to resources: http://uxdesign.cc/ux-tools/. These include: wireframing and prototyping, user research and testing, organizing information, card sorting, sitemaps, mind mapping, analytics and metrics tools, and project management tools.

Activity: Research Mobile Stories

Later in this document, we are going to spend time devoted to examining how to bring mobile stories to life in a program called ARIS.

Introduce ARIS to your students by exploring the following games, all of which were created using ARIS.

After concluding your research, take some time to reflect on the types of stories told and the ways in which they were told. Ask students to reflect on what they saw, heard, and noticed when playing the games. This will help identify impactful moments from the playing experience:

• Which stories did they enjoy most? Why?
• How were those stories presented?
• What tools were used to present that story?
• How does the audience understand that story?

Dow Day
http://arisgames.org/featured/dow-day/

STEEL
http://arisgames.org/featured/steel/

UW Campus Tour
http://arisgames.org/featured/uw-campus-tour/

Images from arisgames.org/featured

Instructor Readiness Assessment

Educators should begin the project by reviewing the checklist below to determine the scope and timeline of their students' projects.

Time: The timeframe of a digital storytelling project depends upon the class meeting schedule, the number of students, and the amount of work to be done in class versus outside of class. Many students may be unfamiliar with the technology utilized in this process. It is important to spend time working with students to understand the technology so they can be successful. For this guide, we have broken the process into four sections:

- **Planning**: 3-5 class sessions
- **Pre-Production**: 5-7 class sessions
- **Production**: 7-10 class sessions
- **Post-Production**: 3-5 class sessions

Technology: It will be important to have a good understanding of all the technology and technological tools you will be using. How much technology is available? What will students need to share? Students should have a good foundation and resources to utilize the technology listed below. If students have a limited understanding of the technology, it can create significant delays in the creation process. Some technology you and your students might use includes:

- Computers and/or tablets
- Cameras
- Audio recorders
- Programs like ARIS, Twine, and other open-source web-based tools

Budget: While we highlight free to use programs and methods in this guide, some financial considerations should be made. The process of research and gathering assets can be a place where some financial constraints may affect your process. Some sites will also charge you to use their collections. At times it might be necessary to travel in order to collect assets or conduct interviews. Additionally, if cameras, scanners, or other recording devices needed for your project are not readily available to you, it may be necessary to pay to find equipment or use outside resources.

Student Readiness Assessment

Because digital projects incorporate skills across several disciplines and learning styles, some simple activities and questions can pinpoint your students' strengths.

Start by having students indicate the project areas in which they feel most comfortable. Write each role on a whiteboard and have students sign up where they feel they can contribute. Suggested groups are: Technical Team, Story Team, Creative Direction, and Project Management. Students should also indicate areas where they are not currently comfortable but would like to develop skills or knowledge.

Activity: Identifying Skills

Give students a list that identifies the various skills required to produce multimedia mobile stories, like photography, voiceover, and other skills described in this guide. You can also arrange the skills by groups, as if planning the teams we've mentioned. Ask students to sort skills based on their ability/interest: I'm Good at This; I'm Not Very Good at This; I'd Like to Learn This.

Use clipart or stock images to represent the skills. For example: you might use an image of a camera and the word "Photography." Write students' answers on the board, have them write their preferences, or hang ability level signs around the room and have students move accordingly around the room as you name various skills out loud. If you use the last option, be sure to record the students' choices. The goal of this activity is to create a fun way for students to identify how they can contribute to the creation of the mobile story and ensure everyone has a role to play.

Instructor Documentation

Creating a mobile story can be a rewarding and invigorating experience. Creating detailed plans before you begin will help maintain the organization and efficiency of your building process. Likewise, it is equally important to document the process of creating your digital experience. Documentation includes using written notes and reflections from things you observed in class, taking pictures and video of the creation process, and capturing students' reflections of the process using tools such as written reflections or quizzes. You can use your lesson plans as an outline for the documentation process.

Additionally, maintain a project journal about the challenges and successes throughout the creation process for future reference. It can be important to note where student interactions were either most productive or were moderated to focus the group's work. This will help you create future projects by referencing the ways in which students collaborated to make important decisions during the production process. Teachers may need to make changes or clarifications to the assignments or project steps to ensure student understanding, and should keep notes on these changes for future iterations of the project.

Student Documentation

Students can also maintain a project journal, and, if available, can use class time to work on this. Student journals are a great way to help track the way your students feel about the creation process: how the project is moving along, challenges and successes in collaboration and communication, and moments of inspiration. The journals can be as simple as individual self-reflection in a notebook or scrapbook, or, depending on students' level of technological skill, can be constructed via a collaborative digital tool such as a class Tumblr, Genius, PowerPoint, or video editing tool.

Journals can also be a space where students collect research on the project, identify inspiration, and brainstorm. For example, it can be beneficial to encourage students to make connections to multimedia examples or other digital stories from outside the course such as those mentioned throughout this document. Additionally, daily or weekly writing prompts can encourage students to not only make observations but go beyond those observations to their own feelings and questions about the process and how it relates to other work done in class.

Some writing prompts might include:

During Research

- What do you now know about your topic that you didn't know before?
- What do you still need to learn?
- What are you still curious about?

During the Creation Process

- What worked well? What do you want to change for next time?
- In the process we used today, what is important to remember?
- What works best when collaborating with classmates? Give an example from your experience.
- Give an example of a decision you made today. What led you to make that decision?

During Reflection

- How did you feel at the beginning of this process? How do you feel now?
- What part did you like best? What part did you like least?
- How will this process change how you interact with and think about your community?

PRE-PRODUCTION
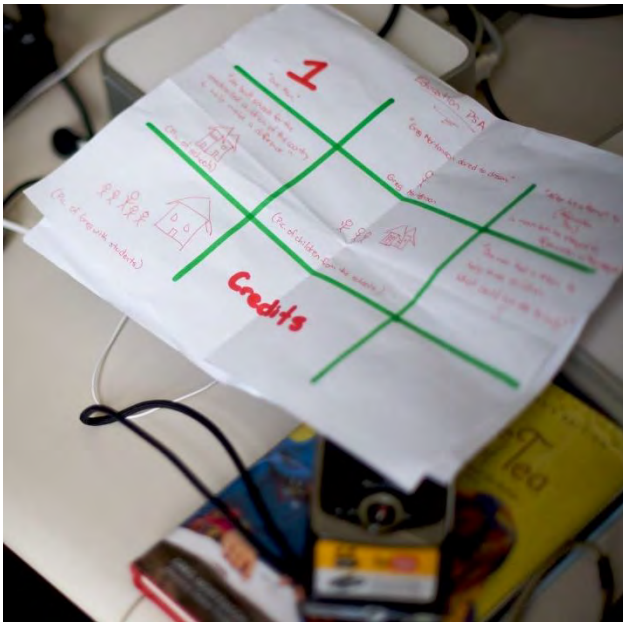
Pre-Production
Crafting the Story

Once you have a strong direction in which to take your mobile story, you are ready to begin crafting a more structured narrative. The techniques in this section are useful for organizing and gathering the elements you will need to make your mobile story before you begin Production.

Drafting a Synopsis

The first step in crafting your story is coming up with its intent or premise. Who, where, when, or what is it about? Who will be interacting with this story? Once you've figured out what you'd like to communicate in your story and to what audience, you can begin to think about synthesizing it into a short and concise synopsis. You have to consider how its start, middle, and end can be condensed into a short paragraph or "pitch." By taking the time to craft a cohesive synopsis you can better communicate your idea to your students, other teachers, collaborators, the public, and potential supporters.

Mind Mapping

A mind map is a method of diagramming that allows you to organize, represent, and understand information visually. At the center of the mind map is a word or idea that branches into related concepts or associated words. A visual exploration can help ideas, plot, details, and characters develop. If you are having trouble writing a story, a mind map can be a great tool to help you connect characters, scenes, and other ideas into a cohesive sequence of events.

The term "mind map" was trademarked by Tony Buzan in 1990. Buzan says, "If you look at all the research on human memory, it shows that the primary way we remember is by imagination and association. For example, if you imagine your best friend, or a computer, what happens in your mind? You don't see words, but an array of images" (Buzan n.d.). This combination of imagination and association is the key to creating mind maps.

There is no right way to mind map. While outlining a story can be very helpful in the creative process, the non-linear style of mind mapping can allow for a more natural storyline composition.
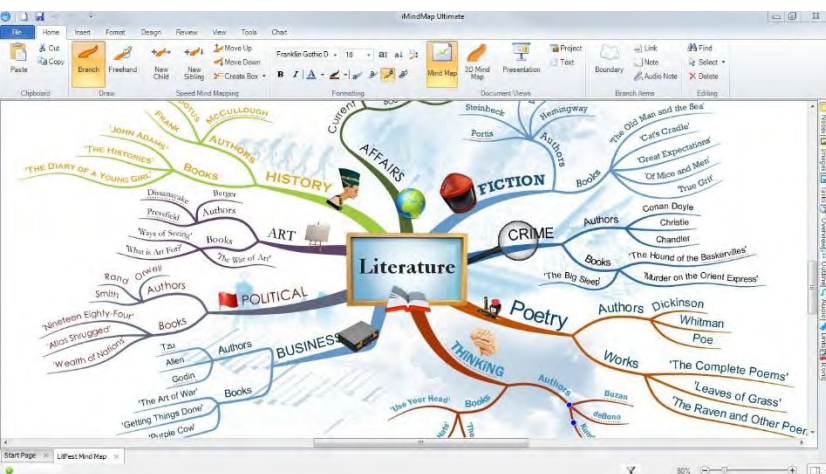
Buzan's 7 Steps for Mind Mapping

1. Start in the CENTRE of a blank page turned sideways. Why? Because starting in the centre gives your Brain freedom to spread out in all directions and to express itself more freely and naturally.

2. Use an IMAGE or PICTURE for your central idea. Why? Because an image is worth a thousand words and helps you use your Imagination. A central image is more interesting, keeps you focussed, helps you concentrate, and gives your Brain more of a buzz!

3. Use COLOURS throughout. Why? Because colours are as exciting to your Brain as are images. Colour adds extra vibrancy and life to your Mind Map, adds tremendous energy to your Creative Thinking, and is fun!

4. CONNECT your MAIN BRANCHES to the central image and connect your second- and third-level branches to the first and second levels, etc. Why? Because your Brain works by association. It likes to link two (or three, or four) things together. If you connect the branches, you will understand and remember a lot more easily.

5. Make your branches CURVED rather than straight-lined. Why? Because having nothing but straight lines is boring to your Brain.

6. Use ONE KEY WORD PER LINE. Why Because single key words give your Mind Map more power and flexibility.

7. Use IMAGES throughout. Why Because each image, like the central image, is also worth a thousand words. So if you have only 10 images in your Mind Map, it's already the equal of 10,000 words of notes! (from: http://www.tonybuzan.com/about/mind-mapping/

Mapping the Story

Retro-script: Once a basic story has been identified you can begin to put narrative ideas to paper and sketch your story's flow, key dialogue, tone, and interactions. Not every spoken or written line of dialogue needs to be included in this format, only the key structural elements and the basics of your conversations and dialogue. This more flexible and preliminary take on the script is referred to as the "retro-script." Retro-scripts are more commonly employed in improvisational performances and comedies but lend themselves readily to the interactive and frequently changing nature of a mobile story.

Choosing the Tone/Emotional Connection/Motivation: To add cohesiveness and salience to your work you must identify the tone. Is your digital story a lighthearted adventure, a dark and mysterious caper, or a straightforward walk through local history? By pinning down your tone early on you'll be able to shape the style of your dialogue as well as the overall mood of the piece.

Notable Plot Points: While drafting your retro-script identify key plot points or interactions that must be included in your final script. Additionally, you should describe the emotional tone, mood, or any key phrases or locations that you must include in your chunks of retro-script. Identifying these points early on in your writing and pre-production process will help you to more easily define the flow and rhythm of the piece. The placement of these points can and will shift during your writing process, but laying them out early on will help you down the line as you consider locations, people, and even your technical workflow.

Storytelling Tools

The tools in this section are helpful for guiding and working through the storytelling process. They are strong tools that will help on the road to the final mobile story. Many of these tools are marketed for making comic strips and can serve the purpose of the basic storyboard structure. Essentially, each online tool in this document helps connect words to images to tell a linear story. This process would be very helpful when beginning to outline the story because many don't require you to have all of your assets (pictures, video, audio, etc.) together yet. You can input sample wording with sample pictures and get an idea of where you are going. Then when you are ready, you can translate this into a more detailed storyboard like the sample provided later in this work.

- **Bubblr**: http://www.pimpampum.net/en/content/bubblr
- **Cartoonist**: https://www.creazaeducation.com/cartoonist
- **ACMI Storyboard Generator**: http://generator.acmi.net.au/storyboard
- **Make Beliefs Comix**: http://www.makebeliefscomix.com/
- **Picture Book Maker**: http://www.artisancam.org.uk/flashapps/picturebookmaker/picturebookmaker.php
- **Pinball**: http://www.bbc.co.uk/scotland/pinball/livewire/
- **Pixton**: http://www.pixton.com/
- **Storybird**: https://storybird.com/
- **Zimmer Twins**: http://www.zimmertwins.com/splash

Identifying Resources and Assets

Stills

Once you begin to acquire and make imagery you must consider their file type and what kind of space or memory limitations you may have for your digital story. Listed below are some common digital image file types and descriptions of their common uses.

JPEG (Joint Photographic Experts Group): The most commonly used, compressed image file-type. JPEGs (or JPGs) are a great file-format for web, phone applications, and even printing if at high enough resolution. They allow for larger images to be compressed without losing noticeable amounts of data. Higher resolution JPEGs tend to be in the 300 DPI (dots per inch) range and around 72 DPI for lower resolution uses or printing.

PNG (Portable Network Graphics): This format is intended for web uses primarily. It allows for images with transparent backgrounds and allows for a higher level of detail and color ranges than GIF imagery. PNG files tend to be much larger than GIFs.

GIF (Graphic Interchange Format): GIFs are the predecessor to the PNG file format. They allow for background transparency in images for web as well as the ability for looping animations. While they have great uses when smaller file sizes are required they have more limitations in color ranges.

BMP (Bitmap): Bitmaps are an uncompressed file type used in some web and print applications. Due to their large file size they are rarely incorporated in to phone-based applications.

TIFF (Tagged Image File Format): TIFFs are an uncompressed, high-quality image format used primarily in commercial printing. This format is usually used for scanning original documents.

By adding media to a story, you can reach and engage new audiences. It is important to understand, however, that the media should add to the story rather than distract the reader. By correctly selecting media to add to a story, you can provide a new level of interaction and emotional connection for the reader.

Audio

To add audio into your mobile story, you have to consider the device your audience will use to listen to it. Consider the device and internet speed limitations, your file size, audio quality, and if you'll be streaming or downloading aural content. Below are a few quick descriptions of three popular audio file formats and their uses.

WAV (Waveform Audio): WAV audio is an uncompressed and extremely high-quality version of an audio file. Often this is the format to which audio recording software will record and export your sounds. As you edit your audio stay within this format to maintain quality. Do not use this format on phones or in situations where bandwidth or device hard drive space is limited, as WAVs tend to be very large.

MP3: This format of audio is a compressed codec type that can bring down the file size of WAV audio. MP3 formats allow for CD quality bit rates (192 kbps) to high quality iTunes level quality (320 kpbs). Depending on your level of MP3 compression you can limit an audio file's size down to something more manageable for a cellphone or streaming use.

AIFF: This format is the equivalent of a WAV file but for a MAC environment. Both AIFF and WAV will allow for extremely high resolution audio when recording and rendering your sounds.

Video

Your digital story may require video components to better communicate your narrative. For your video content make sure to limit your file types to .MOV or MP4. These two formats have common use across MAC and PCs and allow helpful options for compressing file sizes as well as manipulating the video scale for phone, TV, etc.

Quicktime (.MOV): Developed by Apple, this format allows for high quality and uncompressed video formats. MOV also allows for multiple audio tracks or the inclusion of subtitles in your media. While this format can work on both MAC and PC, it will require Quicktime (or VLC Player) in order to play.

Windows (.MP4): This format has broad applications on many media devices and a host of different players. It is commonly used for web videos and allows many options for creating smaller videos in streaming settings. This format works primarily in PC settings but is compatible with MAC.

Technology

You first need to consider the computer operating system you will use to create and manage your content, as well as what device your audience will use. Try to stay within a single operating system environment for your project to limit compatibility issues. If you decide to work with both Mac and Windows computers, be sure to use software that is compatible with both systems (for example, Adobe Photoshop or Adobe Premiere). Also consider investing in an external hard drive to store and back up all of your project files. You never know when you'll have to move your work to a different machine or who else will need access to your content.

Selecting the Appropriate Tools

When selecting the tools to be used for your mobile story it is important to understand the message as well as audience for your story. This is where your synopsis can come in handy. Having some idea of your story can help you begin the process of building it and can give you an idea of what medium would work best.

For example, with "Getting a Job at Nikki's Place," we knew we wanted to tell the story of Nick Aiken and Mama Rose and the history of Parramore. We decided the best way to tell this story would be to take our users on a walking tour.

The ARIS tool was ideal for "Getting a Job at Nikki's Place" because it can be used on a mobile device and it utilizes GPS technology, allowing us to "unlock" certain segments of the story as they visit certain physical locations through the Parramore area. However, you are not limited to creating your story using ARIS. There are several storytelling tools out there, some of which can be viewed in Appendix B Storytelling Tools, so choose one that works for your story.

Once we decided what we wanted to say (i.e., "The story of Nick Aiken and Mama Rose in Parramore"), and selected the appropriate tool (i.e., ARIS), we determined how best to tell the story.

In this case, we decided it would be best to tell our story using a mobile device that they could carry with them while they use our mobile story. If you're having trouble, break down your story idea or synopsis into a to-do list of questions. This may help you better select the tool that's most appropriate.

for our audience. We decided we wanted to help teach 4th-5th grade students about the history of Parramore through an interactive mobile story that takes the users back in time, so they could interact with the story and history as if it were actually happening to them.

Storyboarding

In order to build the structure of your story, it is advisable to make use of storyboarding techniques similar to what is used in film or gaming production. A storyboard is a visual representation of a story's plotline and progression. The information built into a storyboard includes elements like characters, media, locations, script, and interactivity. These items can be easily organized on pen and paper, or using charting software like Excel. This process of storyboarding is particularly useful for planning out when users will be able to interact with the story, and in what ways the story will change based on the decisions made.

In traditional filmed narrative settings the storyboard refers to the visual and narrative organization of the story's shots, scripted sequences, and interactions in the form of drawn interactions and dialogue sequences or sketched imagery physically posted in sequence. In the digital storytelling setting the storyboard will be used more as way to organize the order of your story's flow.

For instance, you can place a sentence or keywords that describe parts of your story on a batch of index cards. You then can lay out these cards on a table or marker board. As you begin to edit your story, shift the placement or order of your cards to find the perfect rhythm for your story. Through this casual process of physically manipulating your story you will come to find new opportunities for narrative elements or better ways to sequence your journey.

A sample storyboard can be found in Appendix D.

Production
Building the Story

When you have your mobile story well planned, you are ready to begin Production. This can be a time-consuming process. Strong Pre-Production documents will help you make sure everything runs smoothly and efficiently as you develop your mobile story.

Where to Find Assets
- **Interviews**: *(See Planning)*
- **History Museums**: Local and digital museums are a great place to find historical images and documents
- **Historical Societies**: These can be a valuable resource for connecting with people that may support your project or offer valuable assets or information to add to your work.
- **Public Archives**: Archive.org and archives.gov are two examples of fair use collections that contain a wealth of imagery, videography, sound, and written documentation.

Collecting Resources and Assets

Scanning Photographs: Scanning photos can allow you to integrate older content or media into your piece. By digitizing a photograph or piece of art you can then further edit, digitally clean, or manipulate it, and then integrate it into your digital project. Always scan photos at a minimum of 300 DPI (dots per inch). The higher your dpi, the easier you can digitally manipulate your imagery.

Prior to scanning any printed art or photography for your project make sure to clean your prints to ensure a clearer scanned image. A gentle brush can be used to clean dust and debris off of older prints. For tougher gunk or dirt try wiping a soft sponge dabbed with distilled water across your photos. If more thorough cleaning is needed for your photos, try using store-bought photographic emulsion cleaner.

Assembling the Story

Content Management

While preparing to build your story it is essential that you put in place a system of digital asset management to reduce confusion and boost your efficiency in production. This system can include digital file storage, file naming consistency, documentation of changes and progress, and other practices.

If you are working with a team, using a system of cloud storage and communication can be helpful when you need to work on the same document, share media, organize thoughts, or store files. A few internet and software tools we made use of for our project included Google Drive, Microsoft OneDrive, and Basecamp. Using cloud storage, you can boost your efficiency and improve the project's organization.

We used Google Drive, in which we could store our documents, make edits, update content, and discuss possible changes without needing to meet face-to-face. In the same manner, we also used Microsoft's OneDrive to store our media files and allow everyone on the team to have access to them.

The third tool we used was the project management application, Basecamp. This tool provides teams with a platform to communicate, schedule, document changes, and generally keep a project organized. We used Basecamp to share important information, such as agendas, action items and meeting notes, discussions, and updates. Providing a common place for yourself or your group to organize thoughts, information, and media is vital to completing a project successfully and efficiently.

File Management

While you are working with and organizing your multimedia content, you may find that some things become lost in your file storage. To avoid this issue it's best to put in place a file naming system early in the project's development. File naming conventions can vary and can be designed to fit a wide range of organization styles and needs. A common method is to name files starting with a date. Be sure to use the same date format: for instance YYYYMMDD. The important thing to remember is that once you choose how you name your files, you need to keep the style consistent during the rest of the production.

Here are a few tips for file naming that can help you stay organized:

- Folder names are just as important as file names
- Make file names unique
- Indicate what the file contains
- Plan to use an ordering system, either alphabetical or by date
- Use lowercase letters
- Don't use the word "final," instead use version numbers
- BE CONSISTENT!

SceneFlow View

Add Node View

Building the Story in ARIS

Important Terminology

Node: A piece of content or a page that can be thought of as a building block in ARIS

Plaque: A node where the player can view text and/or multimedia content

**Conversation**: A node where the player or characters can exchange text-based dialogue

Web URL: A node that can display Web Pages (NOTE: This feature should be thoroughly reviewed before implementing. Not all websites will display or display properly when using ARIS).

Scene Switch: A node that changes the scene to a new chunk of story content. The player can only access content from the scene in which they are currently playing. Use scene switches to change the access to content either as linear or nonlinear movement through the story.

Media: Images, videos, and audio can be uploaded under the Media tab so that it may be included throughout the story at various points. For specific details on compatible media file types and specifications see: http://manual.arisgames.org/editor/media

Locks: Locks are used to create game logic (the flow of the story) for the player throughout the story. Locks can help make sure the player does not access content until conditions such as viewing plaques, receiving items, exiting conversations, etc. have been satisfied. Locks can be placed on Plaques, Conversations, Quests, and other nodes.
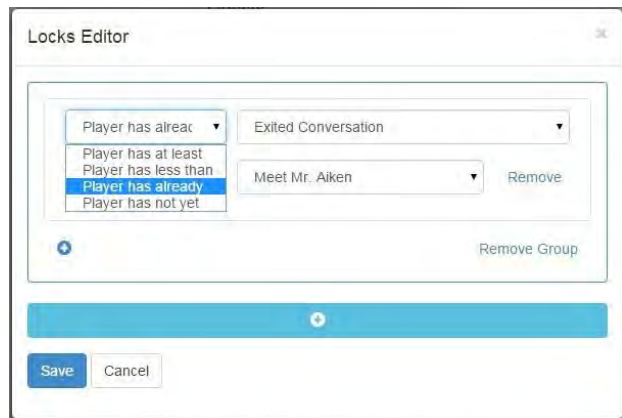
Lock Editor View

Modifying the Player: There are several points in the game logic where you have the opportunity to modify the player by either Taking/Giving one of the following to the player. Each form of modification is listed below:

Items: Inventory that the player can use in the story (example: a key to unlock a door).

Player Attributes: Properties that a player possesses (example: the power to open a magically sealed door).

Workflow sections will also call attention to the opportunities to modify the player.

Workflow

Create Your Intro Scene: You must tell the ARIS engine where the player will start when launching a new game. This can be a Conversation, Plaque, Item, or Web Page. The first item in the Scene (designated as the Intro Scene) will be the starting point for the player.

Block Out Story into Scenes: Chunk the game logic into manageable pieces. Within each scene, the player is restricted to only accessing those Conversations, Plaques, or Web Pages unless otherwise changed by a Switch Scene node. By limiting the player's movement to the scene, you can add an additional level of insurance that the player will not access any content in an unintended order. Each scene needs a Switch Scene node to move the player from one scene to the next. QR codes and Locations used to access Conversations, Plaques, Items, or Web Pages will not be recognized if the player is not in the scene which contains the respective QR code or Location.

Create Quests: Insert Game Logic (Locks/ Modifications). Quests are mini-scenarios that can be assigned to a player to complete objectives in order to advance the story, unlock items, or discover new locations, and whatever else you might be able to devise.

When creating a quest, be sure to have the following minimum requirements in mind: *Start point* (when the player receives the quest) and *End point* (how/when the player completes the quest).

Additionally, at the start or completion of a quest, you can modify the player.

Create Plaques: Insert Game Logic (Locks/Modifications). Create Plaques as story/information nodes throughout the story. The player does not have the opportunity to interact with this type of node other than playing any media used such as audio or video. When the player hits the Back or Continue button, the player leaves the plaque. If you have created the storyboards for your game, analyze them to identify areas where the player is simply observing content as these are likely ideal places to use plaques. If possible, create (at least) placeholder plaques that represent each of these sections so that you can easily add them to the story logic as you continue creating the game.

Create Items: Create all the inventory items that your player will need throughout the game as he/she plays. Items can be used to enhance the game elements of the story by allowing the player to do things such as access content only if they have obtained or even viewed a specific item.

Create Conversations:
1. Create Characters: Within a conversation you can create multiple characters to use throughout all of the conversations you create in your game.

Each character has the following properties:

• **Character Name**: You may have multiple characters with the same name or the same character with different images. In this case, make sure that the character's Name is the same but the Title is different so you can differentiate the characters. This Name is visible to the player.
• **Character Title**: One suggestion is to use Titles that describe the character, perhaps by the image used. This Title will not be visible to the player.
• **Media** (image representing the character): Make sure the image you plan to use has been uploaded to the Media section before trying to add it to the character.

Examples:

2. Insert Game Logic (Locks/Modifications). Within a conversation you can create dialogue nodes in a flow chart fashion. Each node allows you to insert text dialogue, designate the character speaking the dialogue, and also allow the ability to modify the player (see Modifying the Player below).

A follow-up node is also created called a Prompt. Prompts can be controlled by Locks (see Locks above). Prompts advance the player to the next dialogue node. The last prompt in a conversation flowchart always ends with an action which controls what happens next.

Action Options:
• Move to the next line of dialogue
• End conversation
• Exit to a plaque (can be specified)
• Exit to an item (can be specified)
• Exit to a conversation (can be specified)
• Exit to a Web Page
• Exit to a Tab (can be specified)

Create Scene Changes: Insert Game Logic (Locks/Modifications). Use scene changes to switch to the different scenes of content you have created.

Insert/Modify/Verify Global Game Logic: (Locks/Modifications). Once you have created and placed all of your Plaques, Conversations, Items, and Scene Switches, ensure that you have appropriately set the locks on each one of these elements so that the player will only access them when appropriate. In addition, ensure that you have set whether the node is unlocked by Sequence (accessed by meeting the requirements of the Lock on the node), QR code, or GPS location.

Use this time to revisit the Quests you have created and ensure that the Start and End points for the Quest are associated with the proper game logic.

Example: Quest Start - After Player has exited Conversation "Introduction."

Example: Quest End - After Player has at least one "Golden Key."

Set Up QR Codes/Location Access: When using QR codes or GPS locations to trigger content, ensure that attention is paid to where the Plaque, Item, Conversation, or Web Page is located in terms of scenes (as discussed above). Consider using QR codes to allow the player to interact with the physical environment in order to advance the game, obtain items, or start conversations, etc. QR codes can be printed or incorporated into more story-based visuals to provide a more mimetic storytelling approach. QR codes can also be a great way to test the game logic and flow of a game that will use GPS location at some point. By using QR codes, the game can be tested in a location-based simulated environment by placing QR codes around a room that represent actual locations around a city or a campus.

When you are comfortable with your game flow and ready to test the GPS locations, simply switch the trigger from QR code to GPS on each Conversation, Plaque, Item, etc. and make sure you Save the change each time.

Consider using GPS locations when locations in a particular environment are important to the flow or aesthetic of your story. Be cautious when relying on GPS locations as triggers when playing a game situated indoors or when locations are in close proximity. In addition to the GPS signal accuracy, this can result in the engine not properly identifying the player's location which might trigger the wrong content or not trigger any content at all.

Test

One or multiple authors can test an ARIS game before it's published for public use. In the settings menu when viewing the editor, you can set the game to published or private. We recommend the game stay private until you have thoroughly tested it. If you have multiple authors that need to create, modify, or test a private ARIS game, select the Share button from within the settings menu and add other authors using ARIS username or e-mail addresses. Once the accounts have been added the respective authors will have full control over the game in the ARIS editor and will be able to access the game when logged into the ARIS mobile app. When logged into the ARIS mobile app, a registered user can select Mine in the lower-right corner of the app which will show a list of all accessible ARIS games under the user's account. The private app, accessible under Mine while logged into the ARIS mobile app, will represent a published version that can be tested.

IMPORTANT: If multiple people are logged into the ARIS mobile app on multiple devices and playing through the game simultaneously, the game will act as though each player is controlling a single play-through. To clarify further, multiple people should not attempt to play through the game simultaneously on the same account to avoid problems with game logic and flow. See above comments about multiple ARIS accounts and ensure that each author/tester is playing the game on his/her account.

Challenges When Creating an ARIS Mobile Story

Menu logic:
- Exiting to quest log lands on last quest accessed (even if already complete)
- No control over prompt button text or logic on Plaques
- Back button in conversations skips dialogue
- Scene logic can prevent dialogue from the same scene from being accessed due to scene changes

No ability to have a global scene:
- When using scenes the player is restricted to only accessing those Conversations, Plaques, or Web Pages within the respective scene, specifically when using QR or GPS triggers.
- A global scene cannot be created which exists in parallel to the active scene which might have allowed the player to keep certain information, such as a help or menu page accessible by QR code.
- The solution might be to include the example of a help menu as a plaque that exists in every scene.

No control over User Interface (UI) style:
- This limits the look and feel of the ARIS game, only allowing the author control over icons for items, quests, and other media supported elements.
- Properties such as font type, size, color, background color, etc. are not able to be customized at the time of this writing.

Need to limit text to avoid covering images on Plaques and Conversations:
- As a result of the limitations imposed, the author(s) should take into account the length of Conversation dialogue and Conversation Prompts.
- Lengthy Conversation dialogue and Conversation Prompts can result in covering much of the background of a Conversation page which in turn, can block the view of the desired media that the author has chosen for the character, such as a profile image.

POST-PRODUCTION

This section focuses on what to do with your mobile story once you've produced it. While the section in this guide is short, the life of your mobile story after production can be as long as you want. If you can, celebrate your community and the hard work of your students! Be sure to test your mobile story beforehand.

This website has some useful resources on playtesting in the professional gaming field, including a link to an Extra Credits: Playtesting video: http://playtestingworkshops.com/resources.html.

This video does an excellent job of describing playtesting and its value in simple, digestible terms, and could be a useful resource both to teachers and students in understanding playtesting. The video begins by describing the value of playtesting your game, and around 3:00 the video talks about how to begin playtesting and with whom you should playtest.

Playtesting

Playtesting is fundamental to the design process of your mobile story. By playtesting early and often (if possible) you can be proactive in identifying several hurdles that can plague this type of digital narrative. The process of playtesting is relatively self-explanatory in that it involves both playing and testing an interactive product, in this case, a mobile story, ideally using members of (or members similar to) your target audience. Another variant of this process that you might be familiar with is a focus group. One of the major differences between focus groups and playtesting is that you or the creators of a mobile story are excellent participants, whereas focus groups ideally are suited for your target audience or groups that could help inform what your target audience should be.

Playtesting can be done in various phases of the project, essentially at any point where you have a playable version, or even be a paper prototype. By having students play their own game or having other students test the game early, you can identify problems with the quality, gameplay, comprehension, etc. The sooner you get a prototype in front of someone the better, as it could prevent headaches down the road.

Playtesting with ARIS

In "Getting a Job at Nikki's Place," playtesting was very important to the development process. Due to the nature of the workflow for creating a mobile story in ARIS, it was important to test the logic of the game in phases rather than just reviewing the final output. As mentioned earlier, the game logic refers to the game unfolding according to the desired flow. For example, in "Getting a Job at Nikki's Place," the player should not be able to scan or visit the GPS location of Wallace Beauty Shop until after paying the band and viewing the conversation with Mama Rose about the shop. Instead of waiting to finish all story development, you can test the game along the way. If you get the desired outcome, you can then add the next piece of story content. The amount of content you add before playtesting is circumstantial and depends heavily on your tolerance for making revisions. It is also possible to work backwards from a complete story and troubleshoot all of the breakdowns and bugs that occur, but this can become unwieldy rather quickly.

It is best practice to have others playtest your story to have a fresh set of eyes on everything from spelling and grammar to making sure the mobile story is intuitive for the player. You may want to have someone test each scene and instance of a QR code or GPS location you create as you go along.

It is also important to include your target audience when possible to gain their input. Although, it may not be a good idea to have your exact target audience test a work in progress as it may influence their reactions to the final product. For example: if the goal of your project is to create a story for another set of students, include a handful of those students in the testing or ask a comparable group of students to test.

Sharing the Story

If time and resources are available, you can organize an event to celebrate the work of the students and acknowledge any subjects or interviewees that were involved in the process.

Public Demonstration: If the stories were community-based, instructors can set up a presentation for community members and leaders, such as a banquet or ceremony that unveils the students' work to the community. If the work will have a physical display component, such as in a case in the school or the library, this event can be a good opportunity for students to discuss their creation process and experience presenting at an event.

Celebratory Event: A social event is a great way to thank those who were involved in the production or research of the story. This can be a casual party for the students once the work is all done, or they can extend invitations to their interview subjects and family members.

Publish Content: By making the story available to the public on websites and social media platforms, students can learn about these tools and can also gain an appreciation for other published stories and how these relate to the students' own work. This can also inform future projects; students can be asked to create additional media, such as videos, blog posts, or a behind-the-scenes documentary, to help showcase the work.

ACTIVITIES & LESSONS

The following sites have valuable resources for educators and facilitators looking to create digital stories and mobile stories with a focus on youth and community. Some materials give lesson plan ideas or overviews. Others provide similar project examples and templates. The materials on the sites are free to use. Explore and enjoy!

Adobe Youth Voices

youthvoices.adobe.com

Adobe Youth Voices gives youth a way to tell stories using digital media tools that highlight issues of importance to them. There are teacher guides and resources on a variety of subjects including animation, documentary, and photo essay.

Educational Video Center

www.evc.org/tools

The Educational Video Center teaches documentary video skills to youth as a way to develop an interest in social change. The website has great resources for educators to use to help their class learn community documentary storytelling.

Peace in Focus

www.peaceinfocus.org/about.html

Peace in Focus works with youth around the world who have known violence, inequality, and transition. They work with youth to understand how to use photography to tell stories and affect change in their community. They have an extensive list of electronic and print resources.

Stories for Change

www.storiesforchange.net

Stories for Change is an online resource for educators and digital storytelling facilitators to exchange ideas and resources.

FLORIDA STANDARDS

Relevant Florida State Standards (Social Studies), Grades 4-6

(source: www.cpalms.org)

Below are standards we identified as useful to educators in our creation process.

GRADE 4

SS.4.A.1.1: Analyze primary and secondary resources to identify significant individuals and events throughout Florida history.

SS.4.A.1.2: Synthesize information related to Florida history through print and electronic media.

SS.4.A.5.2: Summarize challenges Floridians faced during Reconstruction.

SS.4.A.6.1: Describe the economic development of Florida's major industries.

SS.4.A.6.2: Summarize contributions immigrant groups made to Florida.

SS.4.A.6.3: Describe the contributions of significant individuals to Florida.

SS.4.A.8.1: Identify Florida's role in the Civil Rights Movement.

SS.4.A.8.2: Describe how and why immigration impacts Florida today.

SS.4.C.2.1: Discuss public issues in Florida that impact the daily lives of its citizens.

SS.4.C.2.2: Identify ways citizens work together to influence government and help solve community and state problems.

SS.4.E.1.1: Identify entrepreneurs from various social and ethnic backgrounds who have influenced Florida and local economy.

SS.4.FL.1.1: People have many different types of jobs from which to choose. Identify different jobs requiring people to have different skills.

SS.4.FL.1.2: People earn an income when they are hired by an employer to work at a job. Explain why employers are willing to pay people to do their work.

SS.4.FL.1.6: Describe ways that people who own a business can earn a profit, which is a source of income.

SS.4.FL.1.7: Entrepreneurs are people who start new businesses. Entrepreneurs do not know if their new businesses will be successful and earn a profit. Identify ways in which starting a business is risky for entrepreneurs.

SS.4.G.1.2: Locate and label cultural features on a Florida map.

SS.4.G.1.4: Interpret political and physical maps using map elements (title, compass rose, cardinal directions, intermediate directions, symbols, legend, scale, longitude, latitude).

FLORIDA STANDARDS

GRADE 5

SS.5.A.1.1: Use primary and secondary sources to understand history.

SS.5.A.4.6: Describe the introduction, impact, and role of slavery in the colonies.

SS.5.C.2.3: Analyze how the Constitution has expanded voting rights from our nation's early history to today.

SS.5.G.1.4: Construct maps, charts, and graphs to display geographic information.

SS.5.G.4.1: Use geographic knowledge and skills when discussing current events.

SS.5.G.4.2: Use geography concepts and skills such as recognizing patterns, mapping, graphing to find solutions for local, state, or national problems.

GRADE 6

SS.6.G.1.1: Use latitude and longitude coordinates to understand the relationship between people and places on the Earth.

SS.6.G.1.2: Analyze the purposes of map projections (political, physical, special purpose) and explain the applications of various types of maps.

SS.6.G.1.4: Utilize tools geographers use to study the world.

SS.6.G.2.5: Interpret how geographic boundaries invite or limit interaction with other regions and cultures.

SS.6.W.1.3: Interpret primary and secondary sources.

SS.6.W.1.4: Describe the methods of historical inquiry and how history relates to the other social sciences.

SS.6.W.1.5: Describe the roles of historians and recognize varying historical interpretations (historiography).

SS.6.W.1.6: Describe how history transmits culture and heritage and provides models of human character.

SAMPLE CONSENT

Dear Participant:

The purpose of this study is to conduct research on *(your research interests go here)*. This interview may be entered into an archival collection and portions of the interview may be included in a digital storytelling project, book or research article, and/or on the Internet. Interviewees will be asked to participate in an interview with the project director. You will not have to answer any question you do not wish to answer. You must be 18 years of age or older to participate.

With your permission, this interview will be audio- and/or video-recorded; you may stop the recorder at any time. You will have the choice for your interview to be used in transcriptions for anything that might identify you personally and coded lists will be kept separate from the transcription.

Digital copies of your interview, and any photographs you contribute to the project, will be stored with the researcher for possible future inclusion in an archive and use in research and projects, and may end up in books, articles, films, or other media such as the World Wide Web, DVD, and other interactive media.

There are no anticipated risks, compensation or other direct benefits to you as a participant in this interview. You are free to withdraw your consent to participate in writing at any time and may discontinue your participation in the interview at any time without consequence.

If you have any questions about this research project, please contact (*Your Name Here*) at any of the following:

Phone: *(555)555-5555*; Email: *YourName@Email.Edu*

Research at the *Your Institution* involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, *Your Institution*, *Department*, *Address*. The telephone number is *telephone number*.

Sincerely,

Your Name

Your Title

Your Institution

SAMPLE CONSENT

Mark all that apply.

____ I have read the procedure described above.

____ I voluntarily agree to participate in the interview.

____ I donate the recorded interview and transcript (verbatim and edited) to the researcher for scholarly and educational use.

____ I donate copies of photographs collected by the project to the researcher for scholarly and educational use.

Choose one:

____ I wish my real name to be identified.

____ I do not wish my real name to be identified.

Choose one:

____ I agree to be audio-taped during the interview.

____ I do not agree to be audio-taped during the interview.

Choose one:

____ I agree to be video-taped during the interview.

____ I do not agree to be video-taped during the interview.

_____

Participant (print name)

_____/_____

Participant (sign name) Date

_____

Interviewer (print name)

_____/_____

This is a consent form for adults. A different consent form will be required if working with minors.

IMAGE

EFFECT

_____ _____ _____ _____

TRANSITION

_____ _____ _____ _____

VOICE-OVER

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

SOUNDTRACK

_____ _____ _____ _____

Note: Adapted from Lambert (2006)

SAMPLE STORYBOARD

PRODUCTION TOOLS

Many programs have an educational discount, so keep a look out for discounted prices available to students and teachers on software like Adobe Creative Cloud (i.e. Photoshop, Elements family, Premiere, Final Cut, etc.). The prices listed were collected at the time of this writing

Photo Editing

Adobe Photoshop: (Expert, $9.99/mo)
http://www.adobe.com/products/photoshop.html

Adobe Photoshop Elements: (Intermediate, $69.99)
http://www.adobe.com/products/photoshop-elements.html

Gimp: (Intermediate, Free)
http://www.gimp.org/

PicLits: (Novice, Free)
http://www.piclits.com/compose_dragdrop.aspx

Video Editing

Adobe Premiere: (Intermediate, $69.99)
http://www.adobe.com/products/premiere.html

Final Cut: (Expert, $299.99 K-12 educational price)
https://www.apple.com/final-cut-pro

WeVideo: (Novice/Intermediate, Free)
http://www.wevideo.com

Lightworks: (Intermediate, Free)
http://www.lwks.com/

Audio Editing

Audacity: (Intermediate, Free)
http://audacity.sourceforge.net

GarageBand: (Novice, $4.99 for Mac or iOS)
https://www.apple.com/mac/garageband

Prototyping

Mindmup: (Novice, Free)
https://www.mindmup.com

Twine: (Novice, Free)
http://twinery.org

REFERENCES

Image Sources

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Fort George G. Meade Public Affairs Office: pages 11, 21

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