CHAPTER 2.

FINDING THE JOURNAL OF ODYSSEUS: MAKING AND USING ALTERNATE REALITY GAMES IN THE CLASSROOM

BY JOHN FALLON

PROBLEM SOLVING IN ALTERNATE REALITY

Dolus was designed to augment my seventh-grade English class's reading of Homer's *Odyssey*. I didn't envision—or perhaps I just failed to imagine—a *direct* facilitation of the text and content. As of now, the game operates parallel to a more traditional discussion-based unit that covers myths, epics, and the character of Odysseus as a literary hero. Thematically, however, what makes Odysseus a unique hero in the Greek pantheon is that he is a tenacious problem solver who thinks his way through seemingly insurmountable challenges. I designed *Dolus* to require and develop a similar intellectual resilience. At my school, three of our institutional "core competencies" are resilience, collaboration, and critical thinking, and in that regard the game closely supports my curricular goals throughout the year. (To aid those under the constraint of the Common Core, I have included a list of sample Common Core Standards, Learning Outcomes, and Essential Questions to illustrate how an alternate reality game can be incorporated into today's curricula—see the Appendix). Like many English Language Arts curricula, this game unit is focused on *skills,* not content.

I have split this chapter into two overall sections: *What is an alternate reality game?* and *How do I make an alternate reality game?* If you are already familiar with game-based learning, and in particular alternate reality games, feel free to skip down to the second section. If you want to learn more about how I became inspired to use games in my classroom and what alternate reality games are in general, then read on![1]

WHAT IS AN ALTERNATE REALITY GAME?

Dolus is what is known as an "alternate reality game" (ARG). An alternate reality game is a game that blends everyday digital media with the everyday *physical* environment around the player. These digital media include emails, websites (often "fake" ones created specifically for the game), social media, phone calls, physical or digital documents, and more. Essentially, if you can communicate

1. Author's note: An earlier version of this piece appeared in the Proceedings of the 2014 Games Learning Society Conference.

with it, it can be used as part of an ARG! The primary game element is attempting to solve difficult puzzles using information presented through these media and in the real world. ARGs use a core narrative that ties the puzzles together and usually places the player in the explicit or implicit role of an investigator who uncovers the narrative and subsequent content as he or she solves puzzles to bring the game to its conclusion. In addition, the narrative is often "archaeological" in nature: The story develops through "found documents" and media that players discover either directly or indirectly as they solve the game's puzzles. As a result, a dominant ethos of this particular type of game is "this is not a game"—the game is constructed and delivered in ways to suggest that the narrative and content are "real," and the fictional nature of the game is never explicitly acknowledged by the creators. Similar to the "found footage" film genre, a large part of the fun is pretending the fiction is real.[2] The fact that the game exists in the world around the players—in their email, on social media, and even in the physical spaces around them—makes ARGs feel all the more immersive.

ARGs are a natural type of game to use in a classroom. ARGs do not require a preexisting graphical engine, like a video game does, nor do they require a static physical space and equipment, like a tabletop game does. ARGs can be the best of both the digital and physical worlds. Even better for the classroom: *They can be designed by you to fit nearly any lesson, unit, curriculum, or student need*. It is an educational reality that sometimes commercial off-the-shelf games can be very exciting square pegs for the round holes of classroom limitations or curricular demands. The custom and modular nature of ARGs, combined with their relative ease of content creation, allows educators to design fun, engaging games that can directly support their unique curricular goals and learning outcomes. ARGs also use preexisting media, so they require little to no expert design experience. If you are comfortable using YouTube, Facebook, or iMovie, then you can make an ARG! In addition, they are inexpensive; the plethora of free and low-cost tools means that making an ARG is primarily a consideration of time, not cost.

ARGs are also great for the classroom because the game's challenge is not only the explicit intellectual hurdle of the particular puzzles but the greater "macropuzzle" of problem solving in the modern world. In today's information age, virtually any piece of data is accessible in a few keystrokes; the real challenge is knowing what data or tools you need and when you need them. Half the challenge of alternate reality games is figuring out what tools you require for the immediate task and then teaching yourself how to use them to solve that problem. In that regard, ARGs dynamically combine an ancient element of puzzle solving with the modern demand of finding the right resources among the nearly unlimited choices available and then using them to problem solve. However, ARGs' modular nature also uniquely positions them as an accessible game platform specifically for classroom teachers.

AN ACCESSIBLE EXPERIENCE

More and more gaming resources are available to classroom teachers every day. Video games and tabletop games are leading the charge and they are only likely to grow in educational utility as their quantity and quality increase. However, even games that are explicitly designed for students have built-in limitations that cannot be avoided, limitations that can often preclude them from widespread classroom use. The best tabletop game built from the ground up for students can be played only in the same physical location when students are present; assuming you have the luxury of your own

2. http://en.wikipedia.org/wiki/Found_footage_(genre)

dedicated classroom, leaving a tabletop game undisturbed is still a difficult task at best. Even the best commercial off-the-shelf video game for learning cannot change its code to adapt to unique student and classroom needs. ARGs can literally become a custom game for your classroom. The narrative and puzzles can take any shape or form and as a result, so can the game. Any skill set or content knowledge can be used, so any curricular goal can be incorporated. The only impediment to implementing ARGs is that usually you will have to create them yourself; however, they are an investment that will return significant dividends year after year as they create an immersive, challenging learning experience tailored to your students. Many of my students have told me *Dolus* was the academic highlight of the year for them.

However, one of the most significant advantages of the ARG is its accessibility; a game is useless if your students cannot actually play it when and where they need to. According to the National Center for Education Statistics (2009),[3] there was only one computer in the classroom for about every five American students and only 39% of public schools had wireless Internet connections available to the entire campus (2010).[4] Clearly, there is still an accessibility problem when it comes to video games that either require a classroom Internet connection or a dedicated computer, particularly if each player needs their own single device, as is often the case. However, if we take into account the number of mobile Internet-connected devices in general, such as tablets and smartphones, access improves dramatically.

According to the Pew Research Internet Project (2013),[5] 75% of teens had access to an Internet-connected device such as a smartphone or tablet. Once all Internet-connected devices are taken into account, Pew found, 95% of teenagers have regular access to the Internet in one form or another. As Internet access continues to proliferate, ARGs will become only more logistically feasible for students and teachers. It is this existing ubiquity that ARGs can fully leverage. Because ARGs do not rely on a graphical game engine by co-opting existing media platforms, it is easy to design puzzles that interact with any Internet-connected device, not just a laptop or computer. ARGs give you a gaming-based learning experience that you can be confident that most, if not all, of your students will be able to reliably interact with in and out of the classroom.

MAKING EDUCATION EPIC

I became an educator because through the years I had several excellent teachers who showed me that learning, despite my adolescent certainty, is not a harsh but beneficial medicine one must swallow painfully, but a joyful, powerful experience that can—and should—guide one's life. If as a student I had a few lessons every year that really inspired me, surely I could, through time, design an entire yearlong curriculum that captures that joy from beginning to end. This was my personal starting point as a teacher. As a lifelong gamer, I long ago recognized how much intellectual prowess, resilience, and critical thinking that games can demand from their players. To me, games clearly seemed like the ideal

3. Fast facts - Educational technology. (2009). Retrieved from the National Center for Education Statistics website: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010003

4. Gray, L., Thomas, N., & Lewis, L. (2010, April). Educational technology in U.S. public schools: Fall 2008. Retrieved from the National Center for Education Statistics website: http://nces.ed.gov/pubs2010/2010034.pdf?_ga=1.75464210.1452541699.1401570250

5. Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013, March 13). Teens and technology 2013: Main findings. Retrieved from the Pew Research Internet Project website: http://www.pewinternet.org/2013/03/13/main-findings-5/

vehicle to create a dynamic, engaging classroom experience that would get my students excited about learning.

I was even more confident that games had learning potential because I had a few teachers while I was growing up who used games in their classrooms with great success. My ninth-grade English teacher (who inspired me to become an educator) used his love of role-playing games such as *Dungeons & Dragons* to help us dive deeper into our reading of Homer's *Iliad*. He assigned every student a character from the epic and laid out the rules for what was essentially a collaborative creative-writing exercise to write a crowdsourced version of *The Iliad*. By reading deeply into *The Iliad*, including chapters we skipped as a class or outside mythological sources, you could acquire information about your character and try to shape the building class narrative with your own submissions. You could "upgrade" your character using your research: Give the character a legendary weapon, a superhuman ability, a divine ally, and so on as long as it was found in an existing mythological source. It was instantly one of the most enjoyable classroom experiences I ever had despite its relatively simple design. That unit rattled around the back of my mind during my first few years of teaching, but it wasn't until I played Funcom's massively multiplayer online role-playing game (MMORPG) *The Secret World* that I was able to take this vague impulse for classroom gaming into a real executable unit.[6] *The Secret World* places thousands of players all within the same online virtual environment, where they can play, interact, and battle against each other in a variety of different ways. In *The Secret World,* players take on the role of agents in clandestine organizations (e.g., The Illuminati or The Templars) and interact in a game universe full of supernatural dangers and conspiracy theories come to life.

What attracted me to *The Secret World* was what the game calls "investigation missions". I read an early review that lauded them as deep and interesting puzzle-solving experiences, a large departure from the usual fare in MMORPGs, which are infamous for including dull, repetitive tasks whose completion is often referred to as "grinding," because they are necessary for improving one's character and getting ahead in the virtual world but are generally considered boring in their own right. Much like the "busywork"—worksheets, textbook-comprehension questions, and so on—that is present in so many classrooms, even the work of the gaming world is not immune to getting mired in mindless mechanics of previous generations.

The investigation missions in *The Secret World* required the player to not only use the information and events contained within the game but also the built-in Google browser to search the Internet for the right information and clues to solve the puzzle. A few hours into the game I realized what the designers had done was to include ARG-style puzzles and weave them into the virtual landscape of the game. The confluence of these two types of games clarified the elements I needed to harness to make my own game: the portability of cross-media ARG puzzles, the immersive effect of using real-world information in a fictional game world, and the timeless siren song of puzzle solving. I was spending hours researching arcane topics, decoding ciphers, and sweating over riddles just to play a game. I also realized that the game engine itself was not integral to the experience … I could make these puzzles! *Dolus*, the game about the master thief who has stolen the journal of Odysseus, was born.

6. Funcom Productions. (2012). The secret world [Digital download].

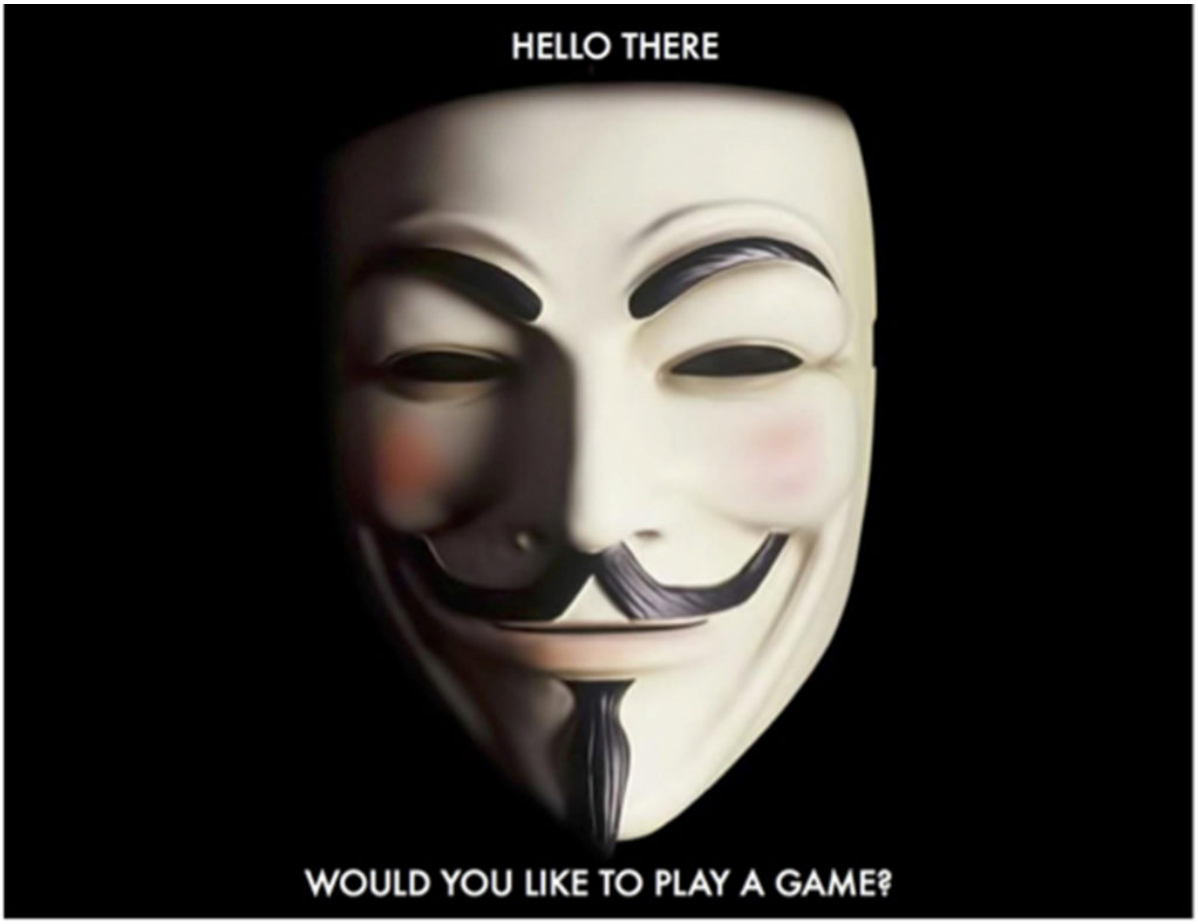

Figure 1. Dolus greets students in an email after they solve the opening "Rabbit Hole" puzzle.

HOW DO I MAKE AN ARG?

Down the Rabbit Hole…

The most intimidating factor in creating an ARG is that you are immediately confronted with a nearly overwhelming number of choices. However, that is also the genre's greatest strength, as you have a nearly unlimited palette of tools to create your puzzles, very few of which require any type of expert design knowledge. The first piece of advice for puzzle creation is: *Steal!* Start paying attention to puzzles and problem solving in your favorite games (especially other ARGs if you play them), movies, books, and TV shows (the mystery genre is particularly ripe for the picking). Ask yourself, "Could this puzzle-solving experience exist on its own or in another format?" Any challenge or puzzle that connects to your lesson outcomes or the skills you want your students to focus on can be used. Using the scaffold of preexisting puzzles will not only help you get started, but it will help you branch out and create your own once you see how they work in an ARG. I find it easier to design chronologically, so I started at the first puzzle for *Dolus* and worked from there.

The first puzzle in any ARG is what is referred to as the "Rabbit Hole." Like in *Alice in Wonderland*, this is the first step into the fictional universe of the game (see Figure 1). This is where the "this is not a game" ethos first presents itself and "rabbit holes" are usually designed to create a feeling that the player has accidentally stumbled onto a hidden reality heretofore unknown to them. The multimedia

element of the game synergizes perfectly with this: Suddenly the game world is *everywhere*, if you're looking in the right place.

The Rabbit Hole is the door into the ARG universe and the introduction to the game itself. A common way to create a "rabbit hole" is to use a popular mechanism of ARGs: the "false document"; for *Dolus*, that is a fictional article purportedly from the BBC.[7] I decided that a fake news article would be a great way to put the game at my students' fingertips and a perfect introduction into the "this is not a game" mind-set. I found Apple's Pages app to be a great resource for document creation since I lacked experience in Photoshop or other professional-level design programs. To create it, I went to the BBC *World News* site and by using screen shots (pressing Command + Shift + 4 on a Mac lets you take screen shots of specific parts of the screen), I simply copied and pasted the different webpage elements onto a blank page in the same configuration. I then formatted the article's text size, color, and font to match the styles on the BBC's website and typed away (see Figure 2). For simplicity's sake, I opted to make the document a PDF since I did not have immediate knowledge to plausibly render the article as a functional webpage. In the end, I think the restraints ended up helping, and I framed the Rabbit Hole narrative as a "cool article I found but seems to have disappeared from the BBC site (weird, huh?)." Once that document is sent to students, the game begins.

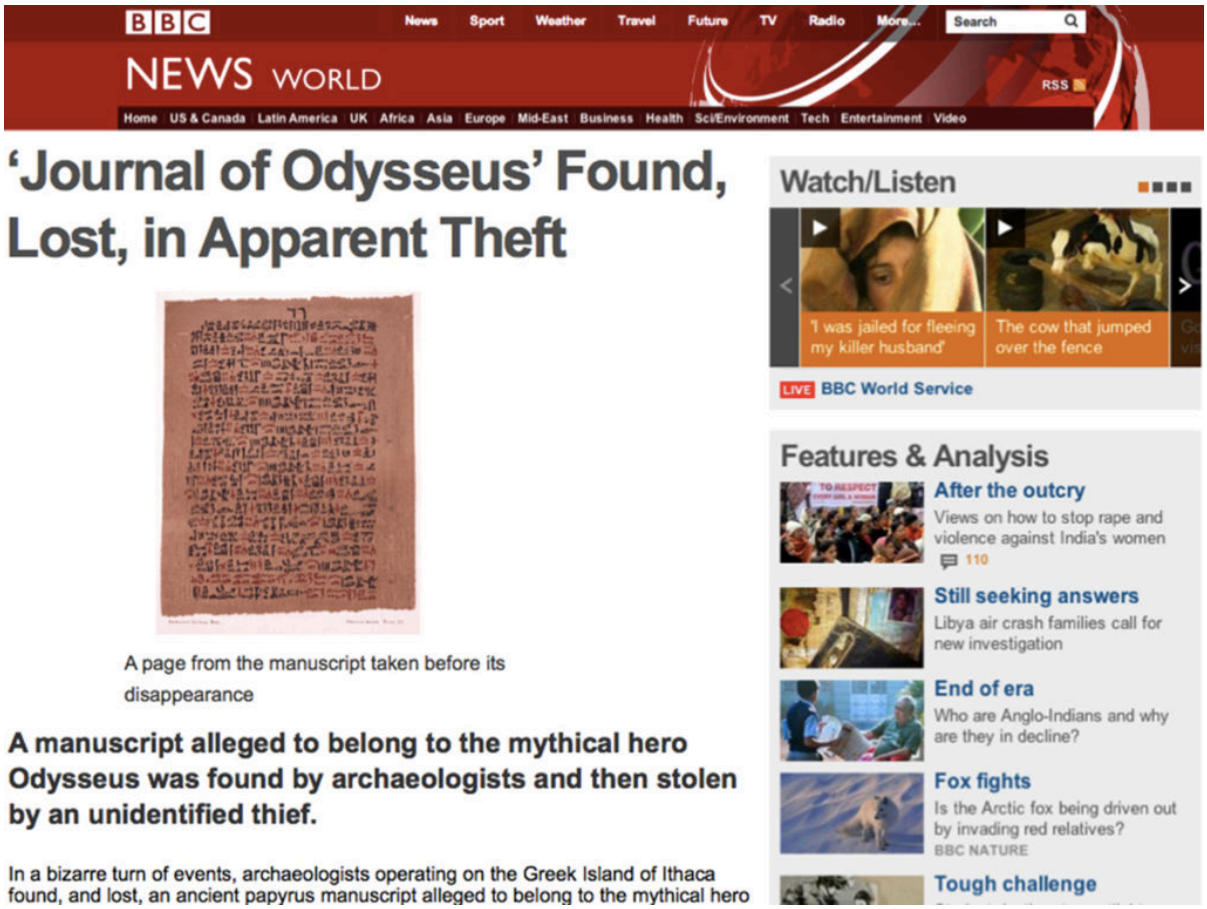

Figure 2. The fictional BBC article is the Rabbit Hole to introduce the existence of the game world.

Early on I decided that the core narrative of the game would be relatively simple but hopefully

7. http://en.wikipedia.org/wiki/False_document

engaging: A priceless document, the "journal of Odysseus", is stolen by a mysterious thief and he is challenging the students, à la The Riddler, to solve his puzzles in order to get it back. The BBC article is written as authentically as possible but does immediately drop some clues that Something Is Strange. The befuddled archaeologist mentioned in the article is named Dr. Henry Jones III (Indiana Jones), for example. The article quotes a mysterious note containing a riddle that begins the hunt; the riddle is worded to explicitly reference an element of my school's culture to draw their attention:

> I have infiltrated the place where the blue door stops all but 9. An email to the mythical creator of that figurine will begin the hunt. Only the blue and white crusaders can play my game.

The "blue door" involves a schoolwide tradition that allows only ninth graders (the oldest students) and adults to pass through that particular entrance. All students would immediately realize this strange note somehow has a connection to the school. To further emphasize the connection, the school colors, blue and white, and mascot, the crusader, are mentioned.

This particular riddle involves some obscure Greek mythology. The article describes a figurine that connects to the myth of Dolus, the Greek god of trickery. Using Google and search terms mined from the article, they should find the myth in question and that "Dolus" created a figurine matching the description in the article. Armed with that name they eventually experiment until they realize that it involves a school email address.

Compared to the types of ARGs found in the corners of the Internet, *Dolus* was designed to deploy comparatively obvious hints and clues, especially in the early game, because this is a genre of game that few, if any, of the students are familiar with. Even then, some students needed a rather significant nudge to read more closely and realize there was a riddle to be solved; this is not surprising because ARGs go to significant lengths to pose as *not* a game! The riddle eventually leads to a fake, but functional, school email address,[8] which was set up with the help of my school's IT department (this was both for immersive effect and to keep game communications within the school network). Once that email is contacted, the student is immediately sent a "welcome video," hosted on a private YouTube video, that sets up the antagonist, lays out the basic "plot," adds some more narrative flavor, and offers up the next puzzle. This also was relatively easy to make. Armed with a laptop, a script, Apple's iMovie, and a quick YouTube tutorial on how to use the free program Audacity to scramble my voice, I laid down an audio track of Dolus introducing himself.[9] In addition to the audio track, I inserted a few relevant images into iMovie (including the puzzle text that was taken from screen shots in Pages; iMovie does not handle large amounts of text well on its own) and uploaded it to a private channel on YouTube under an account made specifically for this game.[10]

iMovie is a great program to use because it mostly relies on simple drag-and-drop mechanics. I dropped relevant pictures and text into the program and then laid the MP3 recording (scrambled in Audacity) on top of those images. The most recent version of iMovie even has an option to directly upload finished videos to different websites, including Vimeo and YouTube, making the process even easier.

8. dolus@fairfieldcountryday.org
9. https://www.youtube.com/watch?v=T0eyx8hvnXU
10. However, I have found Vimeo to be even better, as it has easy-to-use uploading features, especially password protection. I will probably be migrating all game videos from YouTube to Vimeo as a result.

Behind the Curtain

Given the nature of the narrative, I decided it would be best to follow the traditional role of ARG facilitators: "Puppet Master." Being the "man behind the curtain" augments the "this is not a game" element and forces the players to engage directly with the game in order to progress and gain information. In traditional Internet-based ARGs, this is much easier. You simply remain hidden and do not directly contact any game player and communicate only through the "official" game elements and puzzles. In a more pervasive, classroom-oriented game such as this one, it's not as simple. The students usually quickly realize I am facilitating this game—that I *am* Dolus—and try to use me as a resource. However, I chose to remain Mr. Fallon, Mild-Mannered English Teacher, whenever possible and to claim ignorance of the mysterious Dolus and other game elements swarming around the school. In many ways this worked. My students loved the wink-wink-nudge-nudge act and it helped channel them into the game elements instead of trying to short-circuit the puzzles to get the answers from me. However, that did create some issues when students became authentically stuck on a particular puzzle because I wanted to give them hints to keep them progressing, but I also did not want to break character. I have come up with a solution for that conundrum, which I discuss in the "Remaining Questions" section.

Getting Into Character

It is completely legitimate, particularly if you have a dramatic spirit, to put yourself into a character and facilitate the game not only through the puzzles and information, but through yourself as well. For example, Paul Darvasi's *The Ward Game* (paired with his class's reading of *One Flew Over the Cuckoo's Nest* and also included in this book) puts Paul into the guise of a lab coat–wearing henchman of the game's Big Nurse antagonist. Whenever the class playing the game was present, he assumed that character and managed the game directly via that persona. However, the "invisible" Puppet Master role is perhaps easier to manage, but it all depends on your goals and narrative!

Getting Your Sherlock On: Making the Puzzles

The heart of any ARG is the puzzles themselves. This is the most daunting element for those who want to do an ARG for the first time (and second, and third!). The customized nature of ARGs also makes it difficult, but not entirely impossible, to simply import an existing ARG wholesale in your classroom (but individual puzzles can be more easily shared and modified with some effort). Because ARGs use so many different media, they often exist on your hard drive as a sprawl of folders full of documents, images, links, and flowcharts in varying states of organization. In addition, ARGs are often at their best when they incorporate the unique elements of your classroom, school, and community. For example, the Rabbit Hole article and riddle for my game would not work unmodified in another school setting but with some editing, the article could be adapted to be a functional rabbit hole in another classroom. The goal of this chapter is to help you create your own, however, and in that regard, let's take a look at another puzzle created from scratch.

The foundation of many ARG puzzles is codes and ciphers. These not only offer intriguing and challenging critical-thinking exercises but they help avoid a critical design flaw: *false negatives* (Foster, 2013).[11] A false negative—getting or making progress toward the right answer but not realizing it—is perhaps the worst-case scenario for an ARG puzzle. If a student began to correctly solve a puzzle but

did not receive clear or immediate feedback that they did so, the game's puzzles could feel arbitrary, or even impossible. In my experience, students do not mind spending *hours* failing, but *progressing*, to crack a puzzle (in fact, they often love it!). However, if they were to invest significant time in a puzzle only to later realize they had abandoned the right solution hours ago, it could be a fatal blow to their motivation. Codes and ciphers, however, instantly and accurately indicate success. Once you solve a code-based puzzle, the answer wholly or in part reveals itself. Even if they haven't solved the entire puzzle, they achieve a crucial sense of progression. As a result, codes and ciphers are the bread and butter of many ARG puzzles.

In this particular puzzle I chose to use a book cipher because it would potentially involve the physical medium of an actual book, and I found an easily accessible example of the cipher's use in the Sherlock Holmes novel *The Valley of Fear*. In fact, I decided to weave the novel directly into the clue. I used the free text-to-video site, xtranormal.com, to create another video clue.[12] It uses a combination of preset animations and a voice synthesizer for text to speech. I used xtranormal to save time compared to doing another custom video in iMovie but I also found it helped augment the pervasiveness of the game: The more media and formats the games incorporates, the better. It also added to the narrative, which played into Dolus's character as the mysterious thief who can be anywhere, at any time, in any form (see Figure 3). The clue itself was spoken in the video but the key text was also copied in the video description to make it easier for students to use.

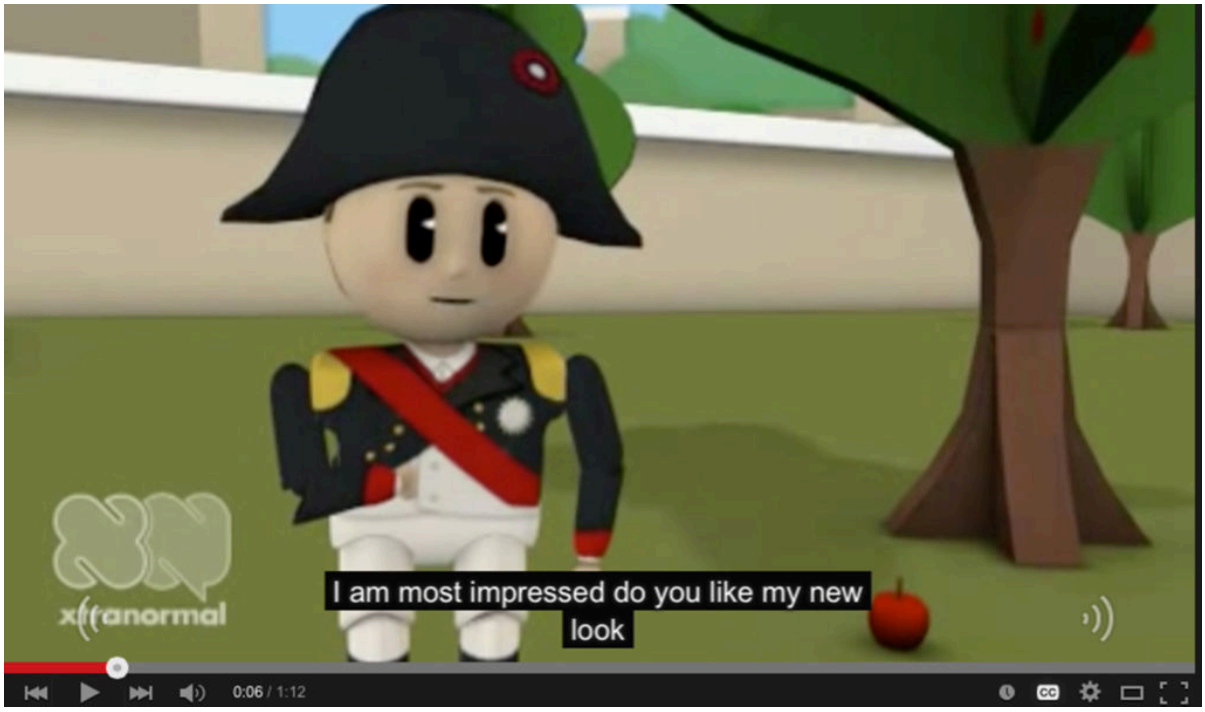

Figure 3. Dolus assumes a different digital form and taunts the students to try to solve his newest puzzle.

The riddle itself reads:

11. Foster, A. (2013, June 17). Alternate reality game puzzle design. Retrieved from Gamasutra website: http://gamasutra.com/blogs/AdamFoster/20130617/194321/Alternate_Reality_Game_puzzle_design.php
12. xtranormal.com is no longer available; however, it has returned as nawmal.com. There is an education version at http://school.nawmal.com/. It looks to be a similar product but I have not yet tried it out as of September 2016.

> When Doyle's detective went to the Valley of Fear, he used this method to discover his first clue. So shall you. Your key, however, is 1 5 9 1 9 4 0 4 2 7. All you need, though, is 108. It is something that is close at hand, I assure you. Once you find your key the door below will open. Good luck!
>
> 220 246 4 223 121 4 225 121 57

In Dolus's video clue he directly references *The Valley of Fear*, which forces the student, at the very least, to find what that is and likely go to the *Wikipedia* entry. From there (or from the novel itself), the students will realize that the "method" Sherlock Holmes used was a book cipher.[13] Modeling their strategy after Sherlock's, they will realize that they need three things: a particular book, a specific page in that book, and specific words on that page. The book they need, the "key," is their classroom copy of *The Odyssey*, identified by its ISBN 1591940427, hence its being "close at hand," and the page in question is 108. (This is also a callback to an earlier puzzle that required students to decrypt a riddle by finding a book's ISBN.)

But what of the seemingly random series of numbers? If the students execute the cipher correctly, they discover that each number refers to a word on the page; for example, 220 is the 220th word on page 108. Once it is compiled correctly (they will realize that they're doing it right very quickly because a sentence will begin to form—no false negatives!), they will see that they are being asked to email Dolus the name of Odysseus's father, something that memory or a quick search will remind them is "Laertes." Once that name is emailed to Dolus, the next puzzle begins.

Let's look at another type of puzzle, one that puts itself into the students' *physical* environment.

13. http://en.wikipedia.org/wiki/Book_cipher

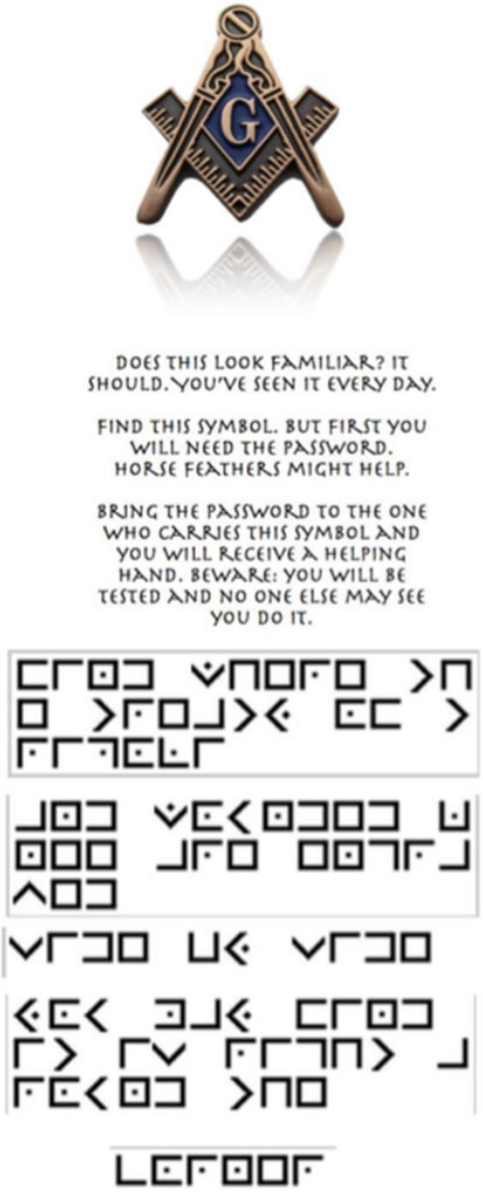

Figure 4. A clue given to students midway through the game. To solve the puzzle, the students need to solve several different elements, both in the real world and online.

This clue (see Figure 4) showed up in students' in-boxes after they completed an earlier puzzle. It reads:

> Does this look familiar? It should. You've seen it every day.
>
> Find this symbol. But first you will need the password. ' feathers might help.
>
> Bring the password to the one who carries this symbol and you will receive a helping hand. Beware: You will be tested and no one may see you do it.

For this puzzle, I wanted to maximize the physical space around the students and really make the

game *pervasive*. If the game suddenly leaped into the physical space around them, it would be even more immersive.

Likely because I had conspiracy-theory narratives floating around in my head after playing *The Secret World,* I tapped the seventh-grade history teacher, who is an actual Freemason, and let him know I wanted to work him and his affiliation somehow into the game. His Freemason lapel pin seemed the perfect way to start the students on their hunt in this particular phase of the game. Realizing that few, if any, students probably ever realized that their history teacher wore that pin every day, I decided to use the symbol directly and have them try to find it. It worked perfectly; quickly, with the help of Google (and some without), they could identify it as a Freemason symbol. However, for a few days this image only simmers in their heads as they search in vain for it around the school, as the clue suggests. Eventually, one day their idle gaze falls on it in history class and they immediately *freak out*. They impatiently wait until the end of class and ambush the teacher, asking for the clue. He, of course, ignores them completely and feigns total ignorance *because they don't have the password*. "Horse feathers" is the only clue in this regard and it has resulted in some hilarious moments of students' shouting HORSE FEATHERS at him, with one thorough student flinging every "horse feathers" synonym (balderdash, hogwash, etc.) contained in the thesaurus at the teacher without avail.

Eventually, students will once more return to the Web hunting for "horse feathers." The most direct route will lead to the *Wikipedia* page for the famous 1932 Marx Brothers film of the same name.[14] Upon perusing the entry they will find that the "Notable Scenes" section contains the following:

> A later scene features Baravelli guarding the speakeasy and Wagstaff trying to get in. The password for entry is "Swordfish".

Finding the teacher alone and uttering "swordfish" causes him to clandestinely administer a test on Freemason iconography that requires some additional research. Once it is completed, they are given a key that allows them to decode the heretofore unintelligible symbols in the rest of the clue, which turn out to be the pigpen cipher, made famous for its use by Freemasons of the past.[15]

Decoding that cipher immediately transitions them to the next puzzle because it reads:

> Find where the Treaty of Tripoli and Wounded Knee are engraved side by side. You may find it is right around the corner…

Continuing the theme of incorporating the physical space of the students, this phase is a hunt for a particular location at school. In classic treasure-hunting fashion, they have to scour the campus trying to find a location that connects to the riddle. By now, they have been made aware that all game information is *very* carefully worded. Key information includes the Treaty of Tripoli (1797), Wounded Knee (1890), the words "engraved" and "corner." This is an example of the pace and scale of the game: This will (probably) not be solved in a day, or even two. ARGs can last for days or weeks as each puzzle in the game may take long periods to break down and solve. Once all elements of the riddle are pieced

14. I should note it is also possible, and pedagogically sound, to edit a Wikipedia page with legitimate information related to the ARG in order to increase the immersiveness of the game, or, from the opposite direction, construct a puzzle that requires students to add legitimate information to a certain article. This could be a great way to directly include writing and research elements common in many ELA curriculums. I have not experimented with that myself, but it could work very well with the immersive element of ARGs.

15. http://en.wikipedia.org/wiki/Pigpen_cipher

together, the students will realize that there are few places at school that have "engravings," but that one of them is the "corner"stone of the school building (right near a main entrance). The engraved years 1797 and 1890, side by side, are the final signpost to look closer. Upon close inspection, they will see that there is a conspicuous stone nestled right under the cornerstone that looks clearly out of place. Within that false stone lies a QR code (see Figure 5); once scanned, it reveals the next page of the journal and the next phase of the game. For many students, this is the climax of the entire game!

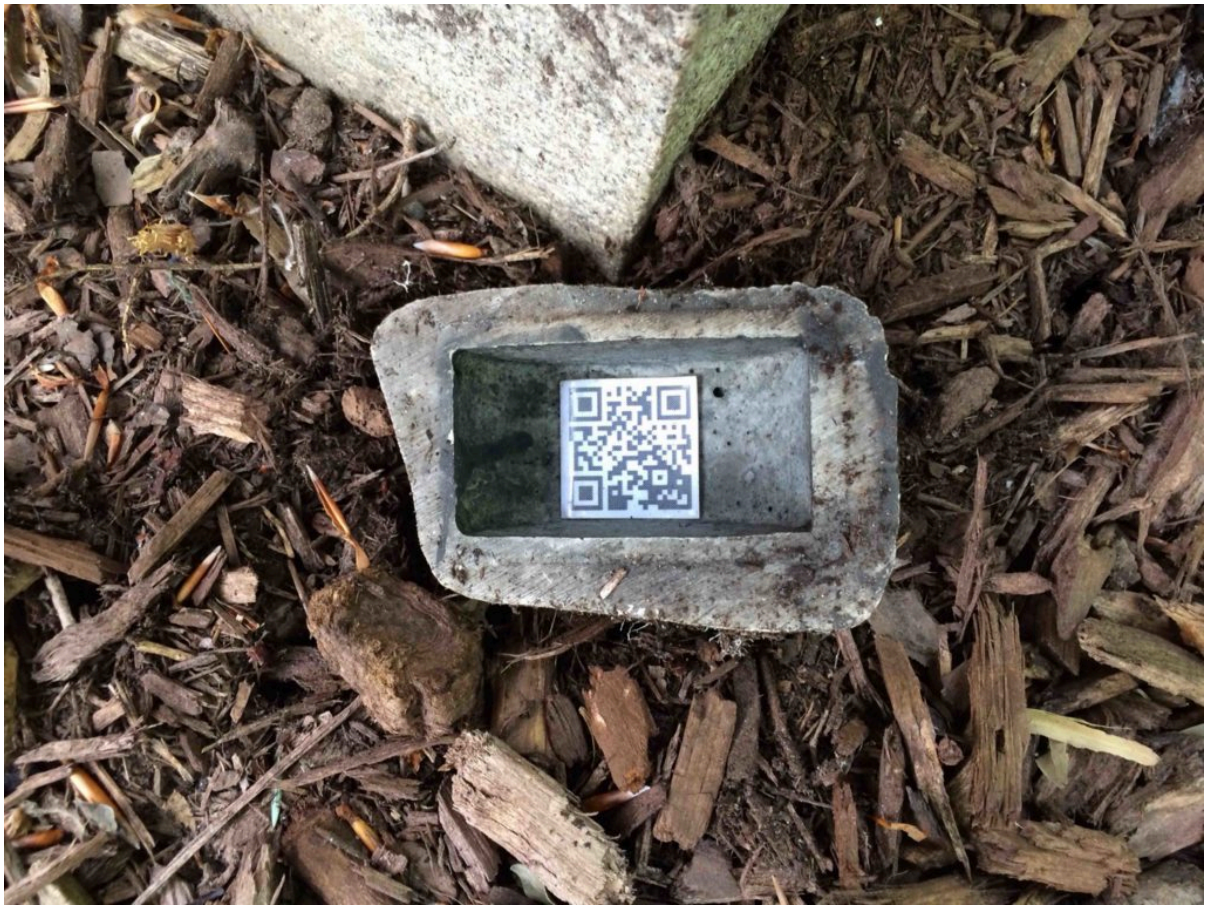

Figure 5. This phase of the game is completed once students track down a false stone by the school's cornerstone.

I hope these examples illustrate the "moving parts" of an ARG puzzle. From here, you can go anywhere. All media, digital or physical, are usable, and ciphers and codes are hardly a requirement, but they do set a very useful foundation. You can do something as simple as writing a mysterious code on a whiteboard and see who can crack it. You could "scale" the difficulty down by adding a hint: Perhaps an unexplained bag of Caesar salad mix sits under it (a hint that it is a Caesar cipher). When it comes down to it, the average puzzle mechanics of an ARG is some type of riddle or code whose pieces are strewn about different areas of the digital and physical world that the student can find. They will have to use research and critical thinking to assess the information in front of them and then synthesize that information to solve the puzzle. However, with your unique narrative and tweaking, it can quickly take shape into almost anything your curricular goals require.

Many questions remain to be answered not only for *Dolus* but also game-based units in general. For many teachers the first question is: *How do I grade this?* As *Dolus* was new territory for my students,

administration, and me, I avoided having to answer this directly by formulating the game only as a sizable extra-credit opportunity. However, as I add content and grow more confident in the game, I intend to make it required. One change I am making is both a mechanical change and a pedagogical one. I will minimize the requirement of the Dolus email address; as of now, many puzzle elements require the students to email their answers to that address, and for "Dolus" to email subsequent puzzle elements to the students, including the "journal page" rewards (which are excerpts from Zachary Mason's excellent *Lost Books of the Odyssey*). However, the best parts of the game are when the current phase automatically flows into the next. If I don't have time to respond to a student's email, they may lose motivational momentum waiting for a response; even worse, I might completely overlook a student's answer in the clutter of my email in-box. Immediate feedback is a powerful element of games and I want to maximize that. By tweaking the game, I can use password-protected documents and videos to automatically "gate" the game: Once a student gets the right answer (usually a password), the next phase will automatically unlock without needing my intervention.

However, because the game is designed to be difficult and make students be resilient, they can, and almost always do, get stuck. I don't like breaking the fourth wall and directly acknowledging the game to give hints, as that undermines the immersive element of ARGs. To avoid this, I plan to borrow a scoring system used in many mystery-genre video games. Each student group (they are placed into groups for the game to encourage collaboration) will start the game with a set numerical score. Every time a puzzle is solved, that score will go up. However, students will have limited opportunities to ask for a clue from Dolus (via his email address). Every clue request will deduct points from that score. This will not only allow me to maintain the invisible Puppet Master role, but I think it will be a fair system for grading. With this system, I may feel confident enough to require the game in some capacity.

However, on top of the ancient tensions that go with grading group efforts, there is the novel problem of how to make game-based learning mesh with traditional grading systems. For something that is designed to be an "old-school game"—completion is not a foregone conclusion—because it is both challenging and thematically fits with the *Odyssey*, I have been hesitant to require it. Does the first group done get an A+? Does the second get an A? Third get a B+, and so on? What if groups never finish? Do they (should they) "fail"? I am hopeful that the numerical score system will be acceptable to students and accurately reflect each group's work and progress.

With both my age group (seventh grade) and my geographic location (suburbia) I am limited by where I can make the game "exist." Much of this is solved by sticking to the well-trodden path of ARGs—digital environment and media—because that is accessible anywhere with an Internet connection. At a 1:1 laptop school (or a BYOD environment), this is a natural fit. However, some of the most successful moments in *Dolus* have been the times that the game goes "outside" the digital and becomes a fully pervasive game—both in the digital *and* physical world. Hunting for the cornerstone and finding the hidden QR code is one of the game's most successful moments. My experience so far suggests that increasing the physical pervasiveness would increase the overall quality of the game.

However, as a teacher of suburban students who cannot drive, the physical pervasiveness appears to be limited to just the school campus (and that still has plenty of potential). Puzzles *could* be engineered to lead to local settings—and it would be quite fun!—but that could become complicated, especially if the game became mandatory. I think that if I were in an urban area and/or with older students, I

would have the freedom to lead them anywhere they could ostensibly travel. Perhaps this is not as bad as I think? Should I not be afraid of a student's begging his parent to go to a local spot so he can solve a puzzle? To me, the game-obsessed teacher, it sounds awesome. But to a busy parent with limited time perhaps it is a ridiculous request.

The second major question: Does the game *work?* After four iterations, I see clear "proof of concept." The students love the "this is not a game" ethos of the ARG. The "Sherlock Holmes" type of thinkers—who have to crack any puzzle or challenge given to them—get addicted fast. There are always a number of students who routinely beg for the next step and then proceed to spend hours of their own time that night to solve the puzzle. The middle-ground students are either interested in playing a "game" or are incentivized by extra credit, or both. Some students hit the first wall and stop; this could be due to a lack of resilience or even disinterest in game-based learning. As hard as it is for me, the game-obsessed teacher, to understand, some people just aren't that into games. And yet it is common for students who struggle in traditional settings to shine in this unit because they can "think outside the box" in the game-based setting. I have seen students, especially the "gamers," feel much more empowered about their learning because they are able to bring their gaming-honed problem-solving skills into the classroom in a way they usually cannot. Conversely, the by-the-book, left-brain type of students can receive a surprising challenge when a unfamiliar puzzle completely stumps them.

But what is really exciting to me is seeing the game utterly warp student conceptions of "school." I'll never forget the shocked look on a student's face when he discovered the game's Rabbit Hole during a study hall and the opening video played out on his smartphone. This was a young man who rarely made a public effort with his academic work and embodied that ever-common "too cool for school" adolescent affectation, but he immediately became one of the most enthusiastic and dedicated *Dolus* players.

The power of this unit and game-based learning in general is that it *compels students who are normally not engaged*. Many traditionally motivated students are still motivated by the challenge and jump into it. However, there are students who are usually less engaged within more conventionally constructed units who dive in headfirst and do not stop. That is a crucial advantage of game-based learning and it illustrates an underappreciated concept*: Games are a learning style.* Teachers should seek to incorporate game-based learning the same way they would for the traditionally advocated spectrum of learning styles.

FINAL THOUGHTS

ARGs are a powerful platform for game-based learning and they offer a unique level of customization, access, and engagement that few other game types offer. Any teacher who knows how to tweet, copy and paste, or make a YouTube video is capable of creating a deep gameplay experience for his or her students that can rival what is found on any video-game screen.

If you want to follow updates to the game and check out some of the created media, see my Working Example.[16]

16. http://www.workingexamples.org/example/show/633

APPENDIX

Example Common Core Standards, Ongoing Learning Outcomes, and Essential Questions for the *Dolus* Game Unit

Common Core Standards

CCSS.ELA-Literacy.CCRA.R1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusion drawn from the text.
CCSS.ELA-Literacy.CCRA.R2	Determine central ideas or themes of a text and analyze their developments; summarize the key supporting details and ideas.
CCSS.ELA.Literacy.CCRA.R3	Analyze how and why individuals, events, or ideas, develop and interact over the course of a text.
CCSS.ELA.Literacy.CCRA.R4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
CCSS.ELA.Literacy.CCRA.R5	Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text relate to each other and the whole.
CCSS.ELA.Literacy.CCRA.7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

Ongoing Learning Outcomes

SLO #1	Students will navigate, evaluate, and ultimately solve a series of problems similar to those Odysseus is faced with in the epic in order to experience the critical-thinking process of overcoming obstacles.
SLO #2	Student will identify, use, and manipulate media and media tools in order to problem solve using 21st-century technology skills.
SLO #3	Students will analyze the choices Odysseus makes on his journey in order to model their own gaming strategy to achieve the same success.

Essential Questions

#1	How can we learn to solve a wide variety of real-world problems using critical-thinking skills?
#2	How can we use media and media tools to solve problems similar to those present in *The Odyssey?*