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Choose Your Own Research Adventure: An Asynchronous Tutorial to Address "Research as Inquiry"

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Abstract

The *Framework for Information Literacy for Higher Education* posits that the practice of asking questions in order to deepen inquiry and understanding is a key element of information literacy. While the "Research as Inquiry" frame is teachable in library instruction, it can be difficult to scale. Popular instructional design software tends to present information in linear formats that can limit how students understand the iterative nature of research. This article presents an attempt at an asynchronous tutorial that overcomes this limitation of medium and that presents "Research as Inquiry" through an iterative and question-based online game. We discuss the development, implementation, and assessment of the tutorial, as well as issues of sustainability and scale.

Keywords: research as inquiry, asynchronous tutorial, choose your own adventure, information literacy

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Choose Your Own Research Adventure: An Asynchronous Tutorial to Address "Research as Inquiry"

The *Framework for Information Literacy for Higher Education* posits that the practice of asking questions in order to deepen inquiry and understanding is a key element of information literacy. The "Research as Inquiry" frame argues that "research is iterative and depends upon asking increasingly complex or new questions whose answers in turn develop additional questions or lines of inquiry in any field" (Association of College and Research Libraries [ACRL], 2015). In other words, research is not a straight path and the process of open-ended questioning, reflecting, and deciding what step to take next, based on newly encountered information, is an act of research itself.

While there may be little debate on the importance of inquiry in research and information literacy, this particular frame has not been the primary focus of information literacy research or teaching practice. In multiple studies over the course of 14 years, Project Information Literacy (PIL) found that the "Research as Inquiry" frame was challenging and the practice of inquiry was underdeveloped: a majority of students found it most difficult to get started on a research project or frame a research inquiry (Head and Eisenberg, 2010a); instructors tended to frame assignments so that research was presented as information-gathering rather than as asking questions (Head and Eisenberg, 2010b); and only 27% of college graduates felt that "college had helped them develop the ability to formulate and ask questions of their own" (Head, 2016, p. 5). In their national "Survey of Information Literacy practices in US Academic Libraries," Julien et al. (2018) found that "the focus of much instruction is the use of databases, search strategies, general library use, and the use of the online catalog" (p. 189). A preliminary scan of assignments uploaded to the Community of Online Research Assignments (CORA) reveals that while many assignments are tagged with the "Research as Inquiry" frame, it can be unclear how an assignment's learning objectives relate to the idea of asking questions or to the knowledge practices or dispositions described in the frame. As of May 2023, 53 assignments in CORA were tagged with the information literacy concept "Research as Inquiry," but most did not focus on question development. Many of these assignments related to the idea of collecting background research, or pre-searching, but the connection to "Research as Inquiry" was not often explicit.

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This is not to say that librarians have entirely ignored the questioning aspect of the "Research as Inquiry" frame. Badia (2016) argued that question formulation is teachable and shared practical examples of how to focus in-person workshops around the art of brainstorming questions on course-related topics. Deitering and Rempel (2017) described their collaboration with faculty in first-year writing courses to create more space for and focus on curiosity within assignments and library workshops, an effort that eventually led to curriculum change. Scharf and Dera (2021) proposed a new theoretical framework for question formulation in information literacy, highlighting how questioning relates to other factors such as external inputs, "pivotal thinking," or search strategies. These examples describe how iterative question-asking can be modeled and practiced effectively in synchronous instruction, whether in a class context or individual research consultations.

Unfortunately, synchronous instruction is not always an option; due to issues of scale or other limitations (such as staffing levels), librarians may have to rely on asynchronous modalities for instruction such as online tutorials or learning objects. Asynchronous tutorials or learning objects have a major limitation: their format. Current technology available to create these tutorials generally favors a linear or static presentation of information, while the quizzes and other forms of automatic assessment upon which asynchronous tutorials heavily rely are rarely open-ended. Learning objects such as LibGuides frequently present the concept of research being non-linear, through text or graphics that show iterative steps or loops (Insua, 2018) yet the LibGuides themselves are linear and static. A scan of the ACRL Instruction Section's Peer-Reviewed Instruction Materials Online (PRIMO) database found several tutorials devoted to developing research questions but, as of May 2023, all included tutorials utilized linear methods of communication such as video or learning objects based on slide decks. This limitation is interesting to consider in light of communication theorist Marshall McLuhan's (1965) famous assertion that "the medium is the message" in his seminal work *Understanding Media: The Extensions of Man.* McLuhan argued that the medium by which content (the "message") is delivered inherently determines what an audience can know or understand about it. Thus, if we are to believe McLuhan, a static and linear tutorial or learning object is likely not the best medium to teach the iterative nature of "Research as Inquiry."

The following article presents an attempt at an asynchronous tutorial that overcomes this limitation of medium and presents "Research as Inquiry" through an iterative and interactive, question-based, online game. We discuss the tutorial's development, implementation, and assessment, as well as issues of sustainability and scale. While we

include feedback from students in this paper, our institutional Research Compliance and Registrar offices determined that the inclusion of unidentifiable student quotes, collected for the purpose of improving a product, does not constitute research and did not necessitate Institutional Review Board (IRB) or Family Educational Rights and Privacy Act (FERPA) review.

Context

The University of California, Irvine (UCI) is a public, research-intensive doctoral university with over 30,000 undergraduate students, the majority of whom identify as first-generation. UCI is a designated Hispanic Serving Institution (HSI) and an Asian American and Native American Pacific Islander Serving Institution (AANAPISI). UCI operates on a 10-week quarter system, and undergraduate students must complete a lower-division writing requirement that is typically fulfilled by one to three quarters of writing courses. One option for students to fulfill this requirement is a first-year, three-quarter-term course called Humanities Core, which enrolls approximately 900 students a year (approximately 25% of all first-year students). UCI Libraries has built a strong relationship with Humanities Core, not only because it is a writing course but also because it is a required, foundational course for all humanities majors and all students enrolled in the campuswide honors program. The Humanities Core curriculum is based on a broad theme (the 2019–2022 theme was "Animals, People, and Power" and the 2022–2025 theme is "Worldbuilding"), and in three quarters students learn to write thesis-driven essays utilizing humanistic methods such as rhetorical analysis/close reading, visual analysis, or comparative analysis. The curriculum culminates in a spring capstone research paper which asks students to select a primary source (typically a film, novel, artwork, etc.), analyze it, and integrate that analysis with secondary research.

The Libraries supports Humanities Core through various resources and modalities throughout the year. In fall quarter, Humanities Core students attend a large-group library orientation, and in winter quarter they participate in a primary source inquiry workshop or orientation led by Special Collections. Students also have access to several online tutorials with videos and interactives that discuss search strategies and research steps. The Libraries maintains a Humanities Core-specific research guide that is embedded into the LMS and curricular pages for the course, and offers online and in-person research consultations specific to this program, bookable through Springshare's LibCal.

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During spring quarter 2020, librarians supporting research consultations noticed that many students were struggling with moving from the act of selecting a primary source to asking inquiry-based questions that would further their analysis of the source. Students reported that they had brainstormed or created concept maps while picking their primary source, and then expected to seamlessly move to "finding articles about the source." They were frustrated when they could not find secondary sources. Inadvertently, our tutorials were teaching students that the research process was step-based: first you brainstorm by making mind maps, next you find articles, and then you write your paper. The students assumed they were not searching "in the right place," or using "the right" keywords while in reality they were not asking enough questions about their primary source to further their research inquiry. For example, a student might choose a popular film and then move immediately to search a database or Google Scholar for articles, using the film title as the search term. If the film is new, they might not find any related articles, leading them to believe that their film cannot be used for the assignment. Many research consultations involved asking students questions, such as what was most compelling about the film, what themes emerged from the film, or what technical aspects of a specific scene in the film (such as the use of color or editing or mise-en-scène) contributed to a deeper academic analysis of the work.

An Iterative Process to Building an Iterative Tutorial

While these research consultations were popular and perceived to be helpful by the students, we knew that we could not scale them to support all 900 students enrolled in the course. All classes had just been shut down due to the COVID-19 pandemic, and synchronous online workshops were proving a difficult modality for instruction. We also knew that in a quarter-based system most instructors would be reluctant to request in-person or synchronous library instruction in the spring quarter given the limited number of class periods per term. Consequently, in summer 2020 we began to ask ourselves whether it was possible to design an asynchronous tutorial that really focused on the iterative process of asking questions in order to clarify and advance a research project around a primary source.

We considered several types of tutorial options, including building an online, quest-style game where students could embark on a research quest and collect digital items upon completion of different activities that represented phases of the research process. We also considered building a Buzzfeed-type "What kind of researcher are you?" quiz with research tips and suggestions built into the student's "answer." Ultimately, these early ideas either

involved too steep a learning curve for production or did not focus enough on the iterative nature of research.

In late summer 2020, we stumbled upon a choose-your-own-adventure simulation created by Cait Kirby, a graduate student at Vanderbilt University. It walked through a day in the life of a student attending a university that chose to re-open for in-person instruction in fall 2020, following a pandemic closure (Kirby, 2020). Kirby's simulation, which was featured in the *Chronicle of Higher Education* (Zahneis, 2020), considered various options universities were circulating for reopening campuses, and presented them as a story from a student perspective. The story asked users to make a series of choices that a student would encounter throughout a day on campus. For example, "Your alarm has been going off for 15 minutes. You're exhausted and you feel like you didn't sleep at all. Do you sleep in or get up?" Each of the user's choices took them to a different part of the story. This entire simulation was built in a free, open-source tool called Twine that is intended for building interactive, text-based stories with branched storytelling.

The idea of emphasizing progress through choice was instantly appealing to us, as it was reminiscent of text-based games such as *Oregon Trail* from the 1980s. Once we searched for choose-your-own-adventure (CYOA) games specifically, we were pleased to discover their varied uses in library settings. Long (2017) described a CYOA story built in Google Sites and Twine, where students can make choices through questions such as "Do you search Wikipedia by using one of the sources under Reference (Background Information) linked on the library website which your university librarian first introduced you to?" (p. 392). Chesley and Anantachai (2019) described a Twine-based CYOA story where students enter a fantasy realm in which scholar–monsters have to "journey through the forests and caves of this strange land and answer citation-related questions" (p. 176). Korber and Shepherd (2019) described a physical flip-book CYOA story that was primarily about internal training for library staff. Hoffner et al. (2021) used Twine and Flowlab Game Creator to create a CYOA story and video game about Open Access. Peterson et al. (n.d.) developed a CYOA Pressbooks ebook about various types of library sources, services, and concepts.

Each of these applications of CYOA stories are innovative and context-specific. The stories described by Long (2017) and by Chesley and Anantachai (2019), in particular, relate to aspects of information literacy instruction. It was not clear whether these tutorials were built to focus specifically on the iterative nature of research, or to take advantage of the motivational factors inherent in gamified learning. We sought to build upon these existing

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models of CYOA stories in libraries and to develop our own tutorial that specifically embraces the iterative qualities of CYOA games as a way to model research practice.

Story Development

Taking our cues from the questions we were asking during research consultations, we began to outline the strategies we wanted students to encounter in our game. There were specific tools and strategies we wanted students to encounter, regardless of which game path they ultimately ended up taking. For example, all students who play our tutorial should be introduced to the library catalog, a database, and citation chaining using bibliographies. We wanted the early stages of the game to offer choices familiar to them based on techniques they'd already learned in class (i.e., they should encounter an option to use Google or Wikipedia early on, and they should also be prompted to think about undertaking a close reading or visual analysis). Instead of trying to cover the entire research process, or all of the possible tools students could use, we wanted to focus on question-asking and how a student might move from one situation or strategy to the next. Additionally, it was important to us that students encounter opportunities to be "stuck," or to reach a dead end that prompts them to go back a step and make different choices. To further emphasize the nonlinear nature of the research process, we also wanted to build in points where students could elect to move backwards or laterally through their game path, demonstrating that sometimes this is necessary to progress one's inquiry.

Because the theme of Humanities Core for 2019–2022 was "Animals, People, and Power," we wanted to select a sample primary source that considered animals in some way. This was one of the more difficult steps of the process, as we wanted to ensure the source might be relevant for future thematic cycles of Humanities Core, thus making our future game updates easier. We serendipitously happened upon the idea of selecting *Tarzan*. One of us was in a racial justice reading group, following the 2020 murder of George Floyd, and the chosen text, Ibram X. Kendi's *Stamped from the Beginning: The Definitive History of Racist Ideas in the United States*, mentioned *Tarzan* specifically. Kendi (2016) claimed "it is hard to imagine a more famous fictional character during the twentieth century than Tarzan—and it is hard to find a more racist plot than what Burroughs wrote up in the *Tarzan* adventure books, which he was writing and publishing almost up until his death in 1950" (p. 300). We liked *Tarzan* as a primary source idea because we felt that it fit with the course's animal theme and could be adapted to future Humanities Core themes dealing with racism, Eurocentrism, colonialism, or other forms of oppression. We decided to use two versions of

Tarzan for analysis: the original 1914 novel *Tarzan of the Apes* by Edgar Rice Burroughs because it was freely available through Project Gutenberg and the 1999 Disney animated film *Tarzan* because it was likely to be familiar to students.

We took approximately three months to write the story for the game, an iterative and collaborative process using Google Docs. We began with the film version and focused on writing in research strategies we often encouraged students to take when dealing with film. For our story, these strategies included concept mapping the film's themes, thorough analysis of film elements (e.g., dialogue editing and color), and tracking bibliographies of known sources. We wrote one complete game path following an inquiry of gender in the Disney film, then created parallel storylines. We worked backwards from decision points until we arrived back at the game's very first choice: film or novel? We repeated this entire process for the novel-focused paths.

In every storyline of the game, students would encounter three strategies: a concept map or close reading, keyword searching, and tracking a bibliography. Students would also encounter the library catalog as well as one or more databases, but the focus of our story was on the questions that led to strategies, rather than guiding students to learn specific tools. We also continued to revise our story so that it would incorporate realistic actions that students, as novice researchers, would likely take. We included options to choose Google searches or scan links from Wikipedia, and also included options such as referring to assigned course readings as jumping-off points for finding other sources. We wanted to include choices that students already understood, so they could see how a familiar, and perhaps more instinctual, choice would play against an option they may not have considered. We also incorporated opportunities for students to change their mind (for example, to move from the film version of *Tarzan* to analyzing the novel instead), or to seek help from a librarian because they felt stuck. Students also would see some repeat options at decision points, which emphasized that you could always return to a past decision and take a different path instead. We sought feedback on the story from Humanities Core faculty as well as from library colleagues who had worked with students in the program.

Tools

We wrote the story intending to eventually move it to Twine (https://twinery.org/), the same software used for Kirby's day in the life simulation. Twine is a free, online, open-source platform for building interactive stories. Allied with the Interactive Fiction

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Technology Foundation, Twine specializes in text-based, branching storytelling. The platform is relatively easy to use once you learn it and no coding knowledge is required, though some familiarity with basic HTML and CSS will help with customization. There are a few built-in story formats that you can use with Twine, each with their own languages and strengths. Twine has substantial documentation from which new users can learn the platform. Twine final products are published as HTML files which can be hosted anywhere.

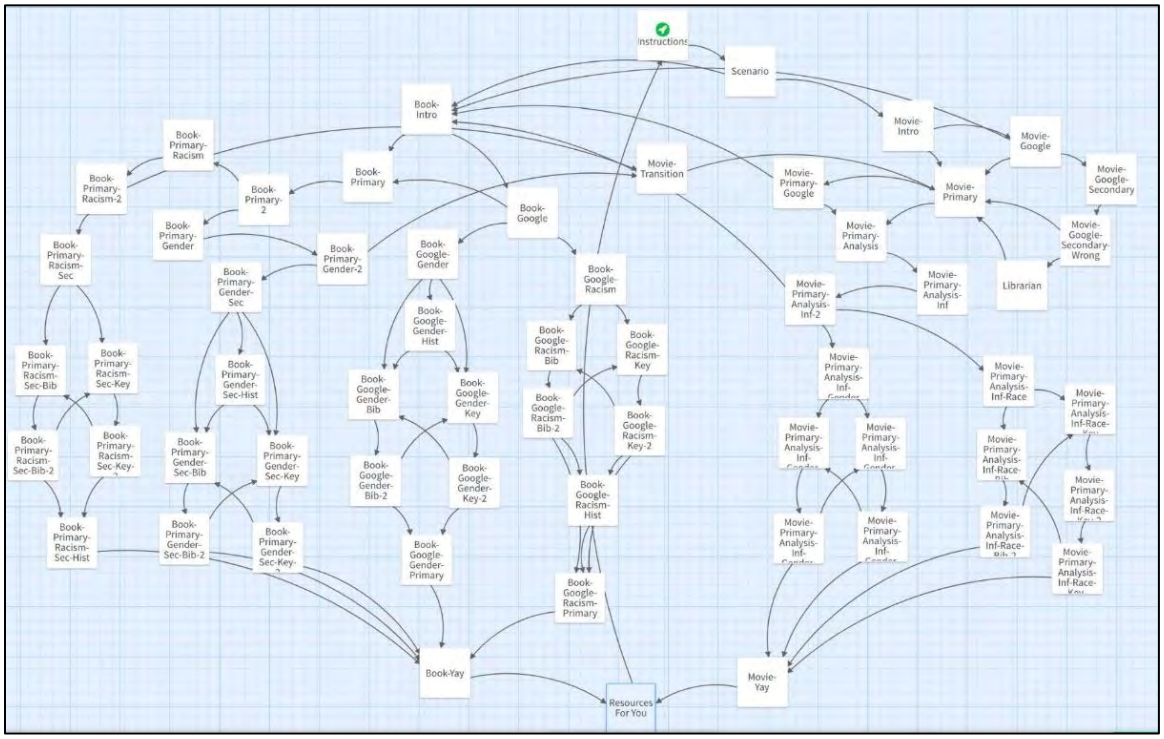
Twine has one major limitation: the software is not collaborative. The file for a story must exist on one computer, and at this time there is no cloud-based sync option; as a result, we used Google Docs as our primary tool for story development. We wrote the game's story in sections of approximately 300 words or fewer, in anticipation of each section being a separate "page" in Twine. When writing in Google Docs, we gave each section a heading that we bookmarked. This enabled us to link to headings in our document to simulate the choice-based branch story that we eventually moved to Twine. Because Google Docs is linear, it was also useful to track the story headings in another document that would help us map out where the story was going and where branches existed. We used Conceptboard (https://conceptboard.com/), a free collaborative online whiteboard, to create a rough overview of the story's organization.

Once our story was finalized, we moved our text to Twine. Unlike other platforms used to create other tutorials, such as Articulate Storyline and LibWizard, which have familiar user interfaces that resemble blogs, slides, or forms, Twine is organized conceptually like a stack of index cards. Content in Twine is built in different boxes—called passages—and the narrative structure and gameplay come from how the passages of text connect to each other. While we outlined the story in Conceptboard and Google Docs and had a general conceptualization of the planned story structure, the options and gameplay coalesced once we saw our passages and their connecting paths in Twine. Figure 1 shows an overview of our story in Twine; each box represents a passage or section of the story while the arrows demonstrate how the paths move. The figure illustrates how a player would progress laterally and/or backwards through the story. As of 2023, Twine's software is unique in its ability to support this kind of nonlinear storytelling.

We built our tutorial in Twine 2.0, which uses "Harlowe" as its default story format. Twine has different story formats to choose from, each using a different set of syntax rules. The Harlowe format defaults to plain black text on a white background, and we kept to this default look while importing our story and testing gameplay. Once we were satisfied with

how our game worked, we focused on presentation. We used a basic CSS stylesheet to unify font families, backgrounds, and page behaviors, and used light HTML and Harlowe syntax to add hyperlinks and text styling to each passage. We also used basic HTML to add illustrative material to many of our passages, such as screenshots from databases, images of mind maps, and links to videos, websites, and resources. We added different backgrounds (designed in Canva) to our Harlowe story format to make the tutorial more visually interesting.

Figure 1: Screenshot of Tarzan CYOA Research Tutorial in Twine



Testing and Pilot Release

We completed a pilot version of the game in March 2021 and conducted our first user tests. This alpha group of testers included a small group of librarians, Humanities Core instructors, and library student workers. Testers were instructed to play the game several times and give feedback, including general impressions of the story, how long it took to complete the game using different paths, and whether there were any broken links or unclear sections. This initial testing helped reveal typos as well as one broken path where the tester ended up in an endless loop of choices. The most common points of feedback

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from the alpha testers were to reduce the amount of text on each page and to improve aesthetics.

After the alpha test phase, we spent the next month correcting errors in the story, dividing longer story blocks into multiple Twine passages, and adding images and aesthetic formatting to the game. We created a screen reader-friendly PDF version of the story paths and linked it to the start page of the game and added to the game's end page a link to a short feedback assessment. The assessment asked students which path they took and used a minute-paper approach to ask students to provide brief comments or reflections on what they learned by completing the tutorial. LibWizard was used for this assessment as it allows for the creation of a certificate that students could turn in for course credit upon completion of the game.

Because this was a pilot release, the *Tarzan* CYOA game (https://humcore.lib.uci.edu/) was introduced to instructors in April 2021 as an optional tutorial they could assign to students early in the quarter. A total of 112 students completed the LibWizard assessment at the end of the tutorial, accounting for a robust beta testing group. We learned from the feedback that over 90% of students chose the film rather than the novel as their primary source. The feedback also confirmed that a major takeaway for students was that research was iterative. In the words of one student:

> I got a better sense of how to navigate my own research into my primary sources. There is no right or wrong way to following a path, and you can always back track or switch to a different direction. As you get deeper into the research is where you become more concise and articulate with your topic and argument.

Another student responded similarly, saying:

> I realized that there were multiple different paths I could choose while considering a primary source and its topic, and that not every step was promising or helpful for my research.… The simulation did help me understand how to get started by showing different steps I could take during research.

Another student offered:

> The paths were vague in my head and the activity was able to clarify the process of delving into a source, exploring various types of media, and lightly skimming for secondary sources.…In walking me through an organized process, I am able to

reflect upon this simulation in order to conduct a structured research process to delve into a wide variety of sources.

The feedback was overwhelmingly positive, with most students stating that the tutorial was helpful in understanding how the research process worked.

Further Iterations

Encouraged by the positive feedback, we continued to make minor edits to the tutorial over the next year. A major cause for revision was the launch of a new library discovery platform for the University of California system in summer 2021, which necessitated changing links and screenshots from the tutorial. The Humanities Core program made the revised tutorial a required assignment in spring 2022, and 618 students completed the feedback form in that quarter. The majority of students again chose the film as their primary source and indicated that they found the tutorial helpful for understanding the iterative nature of research.

The Humanities Core program concluded their "Animals, People, and Power" theme in the 2021–2022 academic year and announced that the theme for the next three-year cycle would be "Worldbuilding." We considered keeping the *Tarzan*-themed tutorial but eventually decided to write a second tutorial that would better fit themes centered around technology, psychology, or speculative fiction. Because we learned from the previous tutorial that students were far more interested in considering a film, we decided to simplify and build the tutorial from a single primary source. We chose the Christopher Nolan film *Inception* (2010) for this tutorial. As the Libraries had a streaming license for this film, students were likely to be familiar with it or at least would have an opportunity to watch it, and it presents clear themes related to psychoanalysis and intertext that would be discussed in the Humanities Core curriculum.

A single author took approximately 60 hours to write the new CYOA story. While the *Inception* story was quite different from the *Tarzan* story, the goal of each story path was similar: to lead students through at least one concept mapping exercise, an introduction to at least one library tool (catalog or database), and an introduction to the idea of using bibliographies or "cited by" tools. Similar to the process used to write the *Tarzan* tutorial, we conceived of approximately four main paths, and then added story variations so that students could jump between paths based on the questions and lines of inquiry they found most interesting. Although we did not write the tutorial collaboratively this time, the author used the same process of writing short sections, with bookmarked headings in Google Docs,

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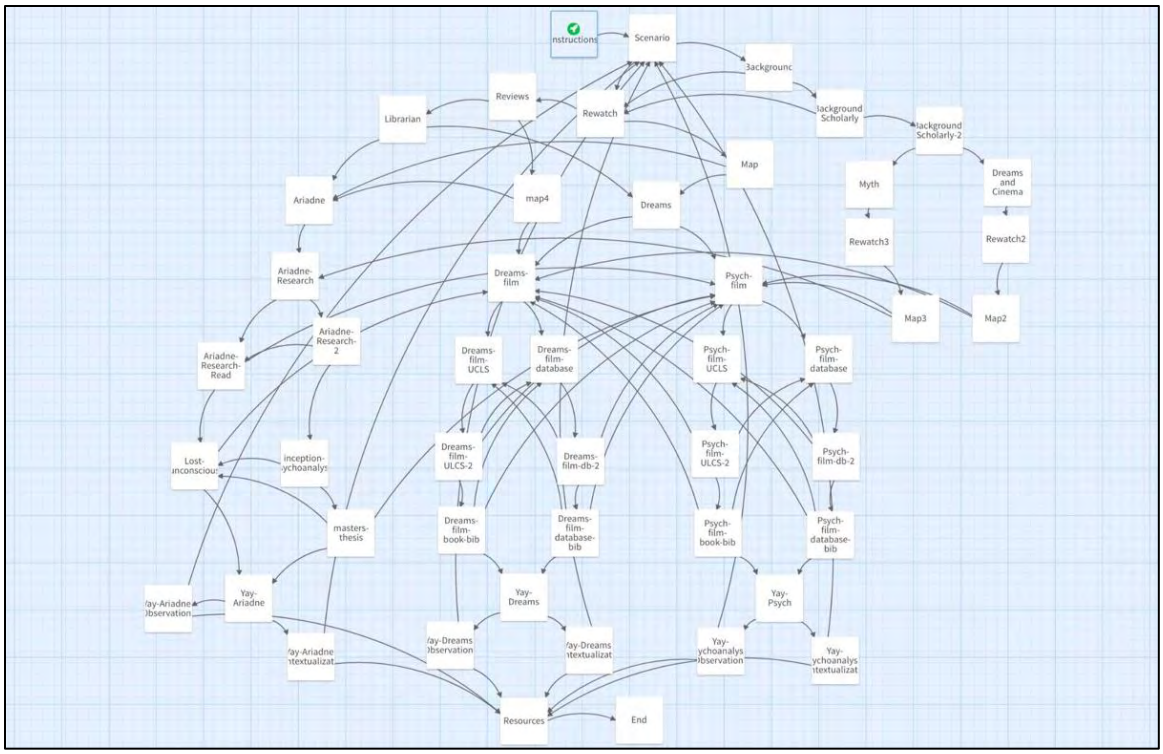
to stand in as passages for when we translated the story to Twine. This proved helpful for creating an accessible PDF version later. Additionally, as we had kept a document of syntax and formatting when building the *Tarzan* tutorial, we were able to use much of this when creating the new game. Building on what we learned from the *Tarzan* CYOA game, we added more points where students could jump forwards, backwards, or laterally in their inquiry. Figure 2 shows the map of the *Inception* tutorial. Compared to the *Tarzan* tutorial, it is visibly more iterative, as visualized by the arrows tracking backwards or laterally within the figure.

Figure 2: Screenshot of Inception CYOA Research Tutorial in Twine



The *Inception* tutorial (https://humcore-2.lib.uci.edu/) was assigned in the Humanities Core curriculum in April 2023, and feedback from this tutorial mirrored that of the previous version:

> In previous quarters, I felt like the research was a lot more straightforward in its process, although that may have been mostly because of my laziness. The simulation helped me understand the action of just jumping in with something I was vaguely interested in, and then asking questions about where I could go from there. I learned

that it was okay to have uncertainty about my initial topic, and how the research process slowly drew me towards more interesting topics.

It was reassuring to know that regardless of the primary source topic, the students' major take-away was that the process of asking questions was central to advancing their research.

Conclusions

While it took considerable time and effort for us to create these CYOA tutorials, our assessments indicate that we were successful in our goal of creating an asynchronous, iterative tutorial that illustrated and enabled students to practice the concept of "Research as Inquiry." The tutorial has not replaced research consultations or information literacy workshops, but it has enabled the Libraries to scale instruction related to asking questions about a selected primary source. Conducting in-person instruction for 600–900 students, with just Humanities Core librarians, would have been comparatively very difficult. While the three-year turnover in the Humanities Core curricular theme presented a challenge, we made efforts to select tutorial topics and story branches within *Tarzan* and *Inception* that complement each other and to include broad concepts commonly discussed in humanistic research, such as racism, gender, technology, and psychoanalysis. We hope that this strategy will enable us to adapt our existing tutorials to future Humanities Core curricular themes without the need to craft entirely new stories.

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