

Engaging Undergraduates in Research Through a Storytelling and Gaming Strategy: Final Report to the Delmas Foundation

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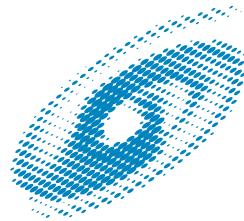
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EXECUTIVE SUMMARY

Why use games to teach incoming students information literacy concepts?

Librarians may be exemplary in terms of assisting students who want to learn about information literacy concepts, but they are able to reach only a fraction of the students who really need assistance. Our solution is to design, test, and evaluate a new method for teaching information literacy that combines dramatic storytelling and gaming (section 1). We have chosen *games* because what people are doing when they are playing good games is good learning (Gee 2004, 199), and *storytelling* to maintain and build player involvement, prevent game play from becoming tedious, trite, and mechanical, and appeal to a wide range of people (Murray 2000). Our name for this new teaching method is *storygaming*. Storygaming has promise for scaling from one student to thousands.

What information literacy concepts did this project target?

We proposed to the Delmas Foundation to develop, demonstrate, and evaluate a *storygame* that teaches undergraduates the General-to-Specific (GenSpec) Research Model for conducting research and finding information (section 1). The GenSpec Model is based on the Search Strategy Model that Evan Farber and Tom Kirk promulgated at Earlham College over thirty years ago (Kirk 1974). The model advises students to start their research with broad overview tools such as general and discipline-specific encyclopedias, handbooks, and histories so they develop a general understanding of their chosen topics. Next, the model advances students to finding tools — bibliographies, abstracting & indexing sources, and catalogs — for specific information on their topics upon which they can build a solid foundation of understanding. Finally, the model advances the few students who want to specialize and achieve depth in their chosen topics to forward-chaining tools — citation indexes — to find the latest cutting-edge research.

How does one play the *Defense of Hidgeon*, this project's storygame?

The *Defense of Hidgeon* is a web-administered board game (section 3). Game action takes place in the middle of the 14th century at the height of the Black Death's sweep through Europe. The objective is to be the Duchy's richest, fastest, and most accurate research team. To accomplish this, teams of four players play the game. They must land on each of the six different monastery libraries and give correct answers at least three times to the questions that are posted at monastery libraries. Correct answers earn teams a scroll and give them the opportunity to purchase an exclusive license to the library or challenge the owning team for its license. Teams are required to collect all 18 scrolls and urged to amass as much gold and property as they can during game play. In addition to the monastery library spaces, a roll of the game's electronic die lands game pieces on spaces that require different actions. For example, landing on the Fox Hunt space puts teams in the Hospital space where they must remain until they complete a task that demonstrates their fitness to continue researching.

The objective of the game is to prove to Hidgeon's ruler Duke Jerome that one's team can be trusted to use monastery collections responsibly, and can quickly, efficiently, and accurately find the desired information. The team to be proven so will be named Lord Researcher, Defender of Hidgeon, winner of the game.

Who played the *Defense of Hidgeon*?

In late October 2007, the project team recruited students from SI 110, "Introduction to Information Studies," a class taught by Professor Robert L. Frost (section 4.1). SI 110 is the School of Information's only undergraduate course and attracts about 75 undergraduate students at all levels from a wide range of majors. Students were encouraged to sign up on teams of 4 to play the game. Game play began on November 3 and ended on November 29, 2007.

How did the project team introduce the game to SI 110 students?

Our inclination was to downplay the game preferring instead to gauge student enthusiasm on the game itself not on a special buildup; consequently, SI 110's instructor mentioned the game in passing to students at the beginning of the semester and did not list it on the course syllabus or on any other formal document distributed to students. Recruiting students for game play, principal investigator Markey gave SI 110 students a brief introduction to the game. She did not want to predispose them to thinking about the game in a particular way, preferring instead that they develop their own ideas about what the game was teaching them (section 4.1).

Were incentives necessary to get SI 110 students to play the *Defense of Hidgeon*?

Initially, 29 of the 75 students enrolled in SI 110 signed up on 8 teams that ranged from 2 to 4 students (section 4.2). Because only one team played the game over the first weekend, SI 110's instructor offered a half-letter grade increase to students who answered 40% or more questions correctly in the course of collecting all 18 monastery library scrolls. In response, an additional 20 students signed up on 5 new teams to play the game. Overall, 49 (65%) of the 75 students in the class signed up on 13 teams to play the game.

What game-play data did the project team collect to evaluate the game?

While SI 110 students played the game, project staff captured data about their game play (section 5.1). Examples are questions attempted by type, questions answered correctly by type, scrolls earned by type, time elapsed since the start of the game, gold amassed, library licenses owned by type, and challenges. Additionally, the project team attended SI 110's three regularly-scheduled weekly Discussion Groups on November 27 and 28, 2008, to conduct focused group interviews with SI 110 students (section 5.2).

Who won the game?

The InfoHunters team won the game with 14,680 points, making an estimated 15 roundtrips around the game board to answer 97 questions (section 6.1). Teams Heroes and Victors placed second and third, respectively. The project team gave \$100 to each of the 4 students on the InfoHunters team, \$67 to each of the 3 Heroes, and \$25 to each of the 4 Victors. The project team considered "successful teams" to be the 6 teams that met the criteria for the instructor's grade increase, that is, earning 18 scrolls with a 40% accuracy rate answering questions, and "unsuccessful teams" to be the 7 teams that failed to meet the criteria.

What patterns characterized the game play of unsuccessful teams?

Some teams were dropouts right from the start (sections 6.2 and 6.4). They signed up on teams but did not play the game. Others tested the waters maybe earning one or two scrolls before becoming dropouts. A few teams played in spurts, for example, the Warriors team spurted from the middle to end of November. Although the Warriors answered questions accurately and were the only unsuccessful team to successfully challenge an opponent, they were unable to sustain game play for the length of time needed to earn 18 scrolls. Unsuccessful teams gave correct answers to 35.7% of questions, about 5 percentage points above what would be expected by chance (Table 6.3).

What patterns characterized the game play of successful teams?

The game-winning InfoHunters were "instant starters." They were the only 1 of 13 teams that began game play immediately after the game started on November 3, and made significant progress toward amassing gold and game assets within a week of the game's start (sections 6.2 and 6.5). The game play of "last-minute rushers" took place during the last 4 days of game play. Most last-minute rushers were concerned with meeting the criteria for the instructor's incentive and did not engage in game play connected with

amassing gold or game assets that would result in a monetary award from the Storygame Project team. Pre-Thanksgiving dashers were a handful of teams that played the game in spurts before Thanksgiving break. Some of these teams became last-minute rushers to achieve game-play objectives connected with the incentive before game play ended on November 29.

Which questions were the most difficult ones and why?

Successful teams answered 51% of monastery library, 53% of Sage Advice, and 65% of Library Study questions correctly (sections 6.5.2 and 6.5.6, and Tables 6.4 and 6.7). Successful teams fared better with web (67%), encyclopedia (62%), and journal-article database (62%) questions because they could do the research *online* at their personal computers (section 6.5.2). Because correct-answer percentages for books (43%), edited works (39%), and citation databases (42%) were only about 10% to 13% higher than players would fare at guessing answers, we sought explanations for such low percentages. In focus groups, game players confessed that they did not visit the U-M Library's reserves collection to borrow books and edited works and examine them for answers to questions (sections 6.5.3 and 6.7.10). In fact, successful teams were less likely to answer monastery library questions correctly when they had to examine any item — a web page, encyclopedia article, book (figure 6.4). The project team speculated that undergraduate students' lack of familiarity with citation database searching and the complicated nature of the game's citation database questions contributed to their especially low accuracy rates for citation database questions (section 6.5.3). Difficult questions were also ones with multiple answers (section 6.5.5 and figure 6.6).

Did teams experience the full range of game functionality?

Because the InfoHunters and Heroes owned most exclusive licenses, all challenges involved one of these two teams (section 6.5.8). Only 1 of 13 challenges was a complete challenge in which both challenger and owning team submitted bibliography entries to the game. The other 12 challenges were incomplete with either challenger or owning team or both failing to submit bibliography entries within the 4-day deadline. In third place, the Victors team lost a handful of challenges to the first-place InfoHunters. The other three successful teams — Valiant, Authorities, and Maize — played the game at a low level, limiting their activity to answering questions and earning scrolls that would enable them to meet the instructor's incentive.

What game functionality was problematic and why?

Despite the project team's best intentions, the Hospital was a real show-stopper (section 6.6.1). Game players resented leaving their personal computers to go a U-M Library to complete the task. They recognized that Hospital tasks gave them opportunities to learn about library services; however, their goodwill about the Hospital turned sour when a stay in the Hospital brought their game play rhythm to a sudden halt.

Game players would have benefited from feedback that told why their answers to questions were incorrect (section 6.6.2). Adding versatility to gold, the game's currency, would figure into the redesign of the game (section 6.6.6). Students identified new and different genres for future information literacy games (section 6.6.6) and suggested solutions to the multiple board problem (section 6.6.5).

What did students learn from playing the *Defense of Hidgeon*?

Students cited these benefits of game play (section 6.7.2): (1) learning how to use the tools of research, (2) doing research tasks connected with various online tools over and over again, and (3) confronting and solving important problems during the research process. They did not explicitly say that the game taught them how to think about doing research or give them opportunities to do so (section 6.7.3). Several upperclassman said they already knew about research and online searching (section 6.7.1). Some students preferred to be told directly what they would learn from game play. Choosing between games and

traditional approaches to learning information literacy skills and concepts, students were divided between the two (section 6.7.4.).

What premises should guide the development of future information literacy games?

Based on our evaluation of the *Defense of Hidgeon*, we arrived at these eight premises that should guide the development of information literacy games generally:

1. Game play must contribute in a useful way to the coursework students are already doing.
2. Game play that gives players mastery over one key concept, task, or procedure is preferable to comprehensive game play.
3. Game play must count toward students' grades in the course.
4. Game play must give students opportunities to see other researchers at work so they can connect what they do to what others do.
5. Students want positive and negative feedback from games to improve their performance.
6. Although students want to be in control during game play, they will collaborate with their peers when the collaboration furthers what they want to accomplish.
7. Students must have concrete evidence that leaving their computer to do research will have a payoff in terms of improving their research or affecting their grades.
8. Game play must foster opportunities for students to reflect on their own research habits and what they are learning.

How can I play the game?

The Storygame Project team moved the *Defense of Hidgeon* to a professional web server. Readers are invited to serve as game administrators and host game play between teams or individuals or a combination of the two. Section 7.10 gives brief instructions on administering public or private games. Navigate to http://storygameproject.org/team/new_account_and_board/ to initiate the administration of a public or private game. Please be advised that finding answers to the game's questions about books, edited works, and journal articles may require access to the monograph collection and licensed digital collections of the University of Michigan.

1 BACKGROUND

1.1 The Problem

Research libraries are leading the revolution from bound paper-based collections to online full-text resources. The “online” advantage is convenience — library users can search, study, and use online full texts at anytime and from anywhere. The “online” disadvantage is context — no longer can library users rely on the physical nature of the bricks-and-mortar research library to reveal important distinctions in the form and function of library resources. In the past, library users could sense these distinctions by physically navigating the research library — its reference rooms, departments, branches, reading rooms, stacks, etc. — or ask a nearby public services librarian where they should go and what resources they should use to further their search for information. Today’s online research library is fast becoming a list of hyperlinks, menu choices, tabs, and icons that neither reveals form-and-function distinctions of available resources nor places a librarian at arm’s reach to help students navigate the maze. Incoming undergraduate students need a “blueprint” to navigate both physical and online components of today’s research library.

Students can turn to various non-credit venues to develop the requisite research skills and knowledge. Librarians are exemplary in terms of assisting students who want to learn about conducting research. They offer workshops, short courses, virtual reference assistance, web-based instruction pages, walk-up service at information desks, in-class lectures, etc. Unfortunately, these opportunities enable librarians to reach only a fraction of the students who really need assistance. Although faculty delegate teaching students information literacy skills to librarians, faculty are primarily concerned with disciplinary coverage, and are therefore reluctant to cede valuable in-class time to librarians.

1.2 Our Solution

Project investigators believe that the solution is to introduce an entirely new method for teaching incoming undergraduate students how to navigate the maze of print and online resources in research libraries. This new method is expected to capture students’ attention because it combines two of their favorite pastimes — dramatic *storytelling* and *gaming*. *Gaming* has many features that facilitate learning. Examples are how game players get results by trial and error, how they stumble across things, follow hunches, repeat actions over and over until they get them perfect, and assume new identities, projecting their hopes, values, and fears onto their new identity instead of shouldering the burden on their real-life identity. To maintain and build player involvement, prevent game play from becoming tedious, trite, and mechanical, and appeal to a wide range of people, a strong *storytelling* component is imperative. Our intent is to merge the appealing features of games into a narrative structure, making character goals and player goals synonymous and motivating players to move forward a character’s agenda while discovering what it is.

Our name for this new teaching method is *storygaming*. We expect that this method will scale from one student to thousands. We proposed to the Delmas Foundation to develop, demonstrate, and evaluate a *storygame* that teaches undergraduates the General-to-Specific (GenSpec) Research Model for conducting research and finding information. The GenSpec Model is based on the Search Strategy Model that Evan Farber and Tom Kirk promulgated at Earlham College over thirty years ago (Kirk 1974). The model advises students to start their research with broad overview tools such as general and discipline-specific encyclopedias, handbooks, and histories so they develop a general understanding of their chosen topics. Next, the model advances students to finding tools — bibliographies, abstracting & indexing sources, and catalogs — for specific information on their topics upon which they can build a solid foundation of understanding. Finally, the model advances the few students who want to specialize and achieve depth in their chosen topics to forward-chaining tools — citation indexes — to find the latest cutting-edge research.

Table 1.1. Five Objectives of the Storygame Project

Activities	Responsibility	Dates
1. Design the storygame	PIs, writer, programmers, and researchers	9 months: 11/2006 to 7/2007
2. Develop the storygame	Programmers & writer with guidance from PIs	7 months: 2/2007 to 8/2007
3. Pretest the storygame to eliminate bugs and streamline game play	Student volunteers in the School of Information (SI) including PIs, project programmers, and researchers	3 mos.: 8/2007 to 10/2007
4. Host storygame play	PIs, SI faculty, and U-M students enrolled in SI 110	1 month: 11/2007
5. Evaluate storygame play	PIs, researchers, and writer	3 months: 12/2007 to 2/2008
6. Convert the storygame for individual game play	Writer, programmers, and researchers with guidance from PIs	4 months: 2/2008 to 5/2008
7. Analyze data and disseminate the results	PIs, researchers, and writer	5 months: 1/2008 to 5/2008

1.3 Project Objectives and Staff

The Storygame Project has the following five objectives:

- Design a storygame that teaches undergraduates the General-to-Specific (GenSpec) Research Model about conducting research and finding information
- Develop a web-based storygame for team play
- Pretest the storygame to eliminate bugs and streamline game play
- Host storygame play and reward winners with modest monetary prizes
- Evaluate storygame play, analyze data, and disseminate the results

To achieve project objectives, Principal Investigator (PI) Karen Markey and Co-Principal Investigator (Co-PI) Victor Rosenberg hired staff with the needed expertise and experience. Fritz Swanson, Lecturer in the University of Michigan's (U-M) Department of English, served as the project's writer. Swanson was responsible for writing the backstory that complements game play and infusing the story into game elements such as game board, pieces, challenges, and the strategy. An avid game player, Swanson also advised the project team on game genre specifically and on game design vision generally. Programmers Andrea Jenkins and Brian Jennings were responsible for game development including multimedia artifacts such as game board, pieces, and leaderboard. Markey's doctoral student Beth St. Jean served as a researcher, assisting the PI to develop the game's question-and-answer database, propose and test the game's scoring algorithm, and conduct the evaluation and data analysis. Joining the Storygame Project in fall 2007, Markey's doctoral student Xingxing Yao was responsible for pretesting and assisting the PI in evaluation and data analysis activities. SI Associate Professor Robert L. Frost taught the undergraduate-level course SI

110, Introduction to Information Studies, where students volunteered to play this project's storygame.

Seven activities were required to achieve the project's five objectives. Table 1.1 enumerates activities, project staff responsible for the work effort, and dates of the work effort.

2 RELEVANT LITERATURE

Today's incoming students have no formal opportunities to learn how to conduct research and find information. Until the 1980s, schools of library science, precursors to today's information schools, were responsible along with college and university libraries for teaching undergraduate courses in "bibliographic instruction" and "library-user education" but these courses fell into disfavor because the academy expects students to arrive on the scene with the requisite skills and knowledge for conducting research or develop them in the course of their undergraduate education. Obsessed with disciplinary coverage, faculty are reluctant to cede valuable in-class time to librarians to lecture students about conducting research (Hardesty 1995; Breivik 1998; Hrycaj & Russo 2007). Students avoid traditional approaches such as short courses, web tutorials, and one-time library workshops to acquiring information literacy skills and concepts because they want just-in-time assistance that is customized to their personal needs and interests (Tiefel 1995; Markey et al. 2005). Even if we rely on these methods to teach students how to do research, they would hardly reach a small fraction of the newly enrolled students in colleges and universities.

When students arrive at the academy, they are operating for the first time in the same rich, deep, diverse information environment that faculty use to teach the knowledge of the discipline, practice, and to extend the discipline's frontiers of knowledge. Bereft of expert knowledge of the disciplines, students are totally in the dark about where to start, how to build on a good start, how to evaluate what they find, and the complicated interrelationships between different research and discovery tools. As a result, students fall back on their habitual patterns: Google and the web (Fast & Campbell 2004; Head 2007).

Our solution is to design, test, and evaluate games that teach students how to use resource discovery tools. We have chosen *games* because what people are doing when they are playing good games is good learning (Gee 2003, 199). Johnson (2006, 31) praises games for their ability to help us "find order and meaning in the world and make decisions that create order." Squire and Jenkins (2003, 29) promote games for good learning because they "encourage collaboration among players and thus provide a context for peer-to-peer teaching and for the emergence of learning communities." Gee (2003, 26) argues that "games are potentially particularly good places where people can learn to situate meanings through embodied experiences in a complex semiotic domain and meditate on the process" and presents three dozen learning principles that are built into good games (207–212).

Recognizing the popularity and potential of games for good learning, librarians are not only adding games to library collections and hosting game play competitions, they are also building and deploying custom games that teach players information literacy concepts (Levine 2007). While these games enlist familiar features such as boards, dice, teams, turns, prizes, etc., they merely test players about what they already know with regard to information literacy content instead of putting players into discovery situations in which they must exercise critical thinking skills to make progress in the game (ACCD 2006; UNC-Greensboro 2007; Poynter 2008). Designing our storygame, we wanted to avoid game play that tested players about what they already knew and, instead, encouraged players to do research for a scholarly topic to make progress in the game.

3 STORYGAME DESIGN AND DEVELOPMENT

3.1 Designing the Storygame: Before the Delmas Foundation Award

Designing the storygame began exactly one year before the Delmas Foundation awarded a grant to the Storygame Project team. The team's initial efforts benefited from an anonymous donor who wanted to support initiatives that promote learning, discovery, and practice in venues where students live, play, and socialize. We were confident that our investigation of information literacy skills and concepts matched the donor's wishes because successful mastery of such skills and concepts not only reaps benefits in the classroom but also promotes lifelong learning.

When incoming students arrive at the academy, they are operating in the same deep and diverse information environment that faculty use to teach and practice their discipline and to extend the frontiers of knowledge. Because students are not prepared to navigate this deep-knowledge environment, they maintain their habitual research patterns: Google and the web. While searching Google and the web may be good starting points, we want storygame play that teaches students how to build on the foundation they get from web resources, puts their attention on library-supplied finding tools, familiarizes them with tool names, scope, and functionality, and gives them practice choosing tools that enable them to achieve increasingly deeper levels of understanding on a topic of interest.

For inspiration, we turned to the General-to-Specific (GenSpec) Search Strategy Model that Evan Farber and Tom Kirk promulgated at Earlham College over thirty years ago and updated it based on our knowledge of electronic resources and the web. Our updated GenSpec Model advises students to start their research with broad *overview tools* such as general and discipline-specific encyclopedias, handbooks, and histories so they develop a general understanding of their chosen topics. Next, the GenSpec Model advances students to *finding tools* — bibliographies, abstracting & indexing databases, and catalogs — for specific information on their topics upon which they can build a solid foundation of understanding. Finally, the GenSpec Model advances the *few* students who want to specialize and achieve depth in their chosen topics to *forward-chaining tools* — citation indexes — to find the latest cutting-edge research.

During the Storygame Project's first year, project team membership was fluid and impermanent. Most of the time, project team members had expertise in game play, creative writing, programming, library research, and information seeking. Our efforts centered on storygame design. Meeting once a week, the project team considered game play scenarios that disclosed fictional and non-fictional elements of a backstory for (1) a family biography, (2) a badly-injured survivor of a natural disaster, (3) a campus-wide quarantine, and (4) an alien posing as a U-M freshman. When game play ended, students were invited to write their own ending to the story. The project team failed to make progress on these ideas. Experiencing turnover at programmer and writer positions, we hired new programmers and writer and brainstormed on different game genres.

3.2 Designing the Storygame: After the Delmas Foundation Award

Designing the storygame was a difficult task because we had to envision how players would experience the GenSpec Model through game play. We wanted to avoid game play that tested players about what they already knew about information literacy concepts and, instead put players into discovery situations in which they had to exercise critical thinking skills to make progress in the game, doing research for a scholarly topic, familiarizing themselves with research tools across a range of disciplines, learning a logical approach to tool selection, and getting practice using research tool functionality to answer closed- and open-ended questions about the scholarly topic.

Eventually, the project team arrived at two storygame ideas: (1) one in which players engaged in bibliography building and (2) a second that enlisted the board-game genre to give players practice navigating, searching, and finding digital resources that answered substantive questions on a scholarly topic. The PIs chose the latter because it appeared to be doable given the project's limited time and staff resources.

The PIs invited student members of the project team to choose the storygame's topic because they are similar in age, mindset, preferences, and sensibility to the game's prospective players. Students chose the "Black Death." They chose this topic because it occurs during a time period that serves as the setting for popular commercial games and several feature films, and the ideas of morbidity, violence, and mystery underlying this topic are likely to appeal to a college-aged audience.

Initially, design progress was slow. Team members with one type of expertise expected members with a different type of expertise to take the lead. To break the logjam, the PI drafted a vision statement that described game play, rules, and objectives, and invited team members to build on its strengths and reduce its weaknesses (see appendix A). Game objectives were simple: (1) avoid "intellectual bankruptcy," and (2) be the first team to answer two substantive questions for the six source types in the GenSpec Model, i.e., web, encyclopedias, books, edited works, journal articles from online databases, and journal articles from the Web of Science. She followed up with a draft game board (see appendix B). The writer drafted a backstory that put game play in the era of the Black Death and located game action in the medieval European Duchy of Hidgeon. The programmers responded with an improved game board featuring an electronic die that controlled game-piece travel around the Duchy and game spaces that issued players questions, collected their answers, and rewarded them for their correct answers.

No longer logjammed, the Storygame Project team accomplished game design and development work simultaneously. Design occurred as late as July 2007. The project team recognized the need to increase interactivity and added a challenge to the storygame. In the challenge, game players compete against one another to wrest control of their respective game assets.

Game design was truly a project *team* effort. Team members proposed a wide variety of new ideas that built on the PI's original vision statement. As the programmers made progress on game development, the Storygame Project team reviewed their progress at weekly meetings and realized gaps where none were previously apparent. In response, team members proposed the design of new game features and functionality, they arrived at a consensus about how features and functionality would work during weekly meetings, and team members worked together to incorporate them into the storygame. For example, the PI recognized the need for incorporating ready reference sources into the game but she was unable to find a place for them in her original vision statement. When the programmers tasked the writer with preparing storylines for non-reserved game spaces, the writer named them "Sage Advice" and suggested that these spaces should put game players in situations where they would have to learn more about online library resources. This was the breakthrough the PI needed to infuse the game with ready reference sources. The programmers added "Sage Advice" functionality that displayed questions, researchers researched ready reference sources for questions and answers pertaining to the Black Death and added navigational hints, and the writer added a storyline involving "Sage Advice" to the game.

3.3 Technical Design and Development

3.3.1 Overview

The Storygame Project involved the design and development of a database-driven web application using a framework with a highly interactive user interface so that the project team could easily manage data and customize future versions of the game. The Ruby on Rails Web Development Framework met these criteria, and it provided an efficient development environment. Ruby on Rails is open source and written in the Ruby object oriented programming language. Our web-based board game was primarily written in Ruby along with HTML and CSS.

3.3.2 Ruby on Rails

The Ruby on Rails framework (also known as Rails) offers both the features necessary to build a decent-sized web application and ease of use making it a superior choice for this project. Rails is known for following the “Do Not Repeat Yourself” (DRY) and “Convention over Configuration” (CoC) philosophies. DRY means that code for a specific action is stored in a single location. Code can be easily reused and edited making for more efficient development. This was essential during the creation of our gaming environment. Rails’ application of the DRY principle allowed us to easily create dynamic web pages that could change according to game events and players’ actions. “Convention over Configuration” dictates that a developer only needs to specify unconventional aspects of the application. Following the Rails convention limits the amount of configuration required of the developer.

3.3.3 Interactive User Interface and Efficient Data Management

Rails uses the JavaScript libraries to support the use of Ajax and to create graphical interfaces. Javascript and Ajax enhanced our game’s interactivity. It allowed us to display the users’ game play content and statistics primarily from one single interface. Also, it allowed for real-time updates to the interface. This minimized the need for players to navigate away from our web application’s main game board interface creating a cohesive game play experience.

The storygame warranted easy data management and frequent data manipulations. Rails’ ActiveRecord layer provided logic to interface with the database making data manipulation more manageable than other commonly used frameworks. Also, in Rails, the need for writing extensive SQL statements to manage data is greatly limited, again, enhancing efficiency. Data is stored in a MySQL database. MySQL is a popular data management system for web based applications.

3.3.4 Customization for Future Versions

Ruby on Rails uses the MVC software architecture that essentially makes the distinction between the applications data, user interface, and control logic. Therefore, there is a clear distinction between our game play content, user interface and gaming logic. This separation allowed us to develop a game that can be easily customizable and the game’s topic could be easily changed. By replacing limited aspects of the themed content and user interface, the game can easily adopt new themes.

3.4 Storygame Design: Defense of Hidgeon, The Plague Years

The subsections that follow describe the design of our project’s storygame named *Defense of Hidgeon: The Plague Years*.

3.4.1 Backstory

The storygame's backstory sets the stage for game action, goals, rules, and scoring:

It is the middle of the 14th century, and the Black Death is racing toward the Duchy of Hidgeon. Past plagues have left Hidgeon untouched because the duke's ancestors knew the secrets to keeping it at bay, finding the right answers in the duchy's monastery libraries that are filled with huge catalogues of arcane knowledge wholly unknown, some say unknowable, to anyone outside of the Duchy. Because previous attempts at collecting information were random and haphazard, the monks who care for monastery libraries will only open them to certified researchers. You and your opponents must prove to both the monks and Duke Jerome that you can be trusted to use monastery collections responsibly, and can quickly, efficiently, and accurately find the desired information. The first to be proven so will be named Lord Researcher, Defender of Hidgeon, winner of the game.

3.4.2 Game Overview and Objectives

The *Defense of Hidgeon* is a web-administered board game. Game action takes place in the middle of the 14th century at the height of the Black Death's sweep through Europe. The objective is to be the Duchy's richest, fastest, and most accurate research team. To accomplish this, teams of four players play the game. They must land on each of the six different monastery libraries and give correct answers at least three times to the questions that are posted at monastery libraries. Correct answers earn teams a scroll. Teams are required to collect all 18 scrolls and urged to amass as much gold and property as they can during game play.

In addition to the monastery library spaces, a roll of the game's electronic die lands game pieces on spaces that require different actions. For example, landing on the Fox Hunt space puts teams in the Hospital space where they must remain until they complete a task that demonstrates their fitness to continue researching. Teams landing on the Well space throw their precious gold into the well to make a wish. Landing on the Garrison space puts a team's game piece in a scenario in which teams lose or gain gold.

Teams are encouraged to amass as many game assets as possible because each team's wealth-building expertise is assessed when game play is over. The team that is the first to land on a monastery library and answer a question correctly can use its gold reserves to purchase an exclusive license to the library. Opponents who land on monastery library spaces owned by other teams must pay the owner a landing fee. Opponents can also challenge the owning team for its exclusive license to the library. Challenges entail recommending research resources to Hidgeon's ruler, Duke Jerome, that he can use to keep the Duchy's population from panicking over the dangerous encroachment of the Black Death.

Teams do not experience the "turns" that characterize physical board games. Instead, teams play the storygame anytime they want and for as long as they want. Teams are warned not to guess at answers to questions. Incorrect answers to questions triggers the game's scoring algorithm to deduct points from teams' scores. Teams are urged to do the research, strive for accuracy, and maximize on opportunities to become rich by earning gold, obtaining exclusive licenses, and wresting control of monastery libraries from opponents.

The objective of the game is to prove to Duke Jerome that one's team can be trusted to use monastery collections responsibly, and can quickly, efficiently, and accurately find the desired information. The team to be proven so will be named Lord Researcher, Defender of Hidgeon, winner of the game. Final game scoring takes these four factors into consideration: (1) how many scrolls per library type a team earns, (2) how long it takes one's team to earn 3 scrolls for each of the 6 library types, (3) how many correct and

incorrect answers one's team submits to the game, and (4) how much wealth one's team amasses in the form of gold and exclusive licenses.

3.4.3 The Game Board

Game play takes place on the web-based game board shown in figure 3.1. Game pieces start on the top left of the board at the Castle of the Duke. They move in a clockwise direction on a path that looks like the letter "B." In figure 3.1, the player's game piece is a "peasant man" and is located at the bottom center of the board.

Figure 3.1. Defense of Hidgeon's game board

On the board are these 34 game spaces: 17 Monastery Library spaces, 4 Sage Advice spaces, 2 Garrison spaces, 2 Library Study spaces, 2 Oracle spaces, and one each of the following spaces: Fox Hunt, Manor House, Tavern, Well, Public House, Hospital, and Castle of the Duke. After a roll of the die moves a player's game piece forward, the player clicks their team's game piece to receive instructions about how to proceed.



3.4.4 The Game Board's Monastery Libraries

In figure 3.1, a player's last roll of the die lands his "peasant man" game piece on the Rook House Library of St. Albert (see the bottom center of the board). Clicking the game piece, the game displays a question about the Black Death that can be answered by team members who use the type of library resources that matches the monastery library space on which their game piece resides. Table 3.1 lists the game board's 6 monastery library spaces, source type (i.e., web, print or online library sources that game players must consult to answer questions correctly), and how much teams pay (in gold) to answer a question, purchase an exclusive license to a monastery library, pay a landing fee to an owning team, and challenge the owning team.

Table 3.1. Monastery Library Game Spaces

Library name	Source type	Pay for a question	Landing fee	Purchase or challenge fee
St. Isidore of Seville: Western, Central, & Eastern Libraries of	Web	1	1	3
St. Thomas: White, Brown, & Sandalwood Libraries of	Encyclopedias	2	2	6
St. Jerome: Eastern, Western, & Shaded Oracular of	Books	3	3	9
St. Catherine of Alexandria: Green, Blue, & Gold Libraries of	Edited works	4	4	12
St. Albert, Rook House, River House, & Foothills Libraries of	Journal article databases	5	5	15
St. Dominic de Guzman, Black & Silver Libraries of	Citation databases	6	6	18

Table 3.1 puts monastery libraries in the order in which these libraries occur on the game board. Game pieces start their journey around the game board at the Castle of the Duke. Right after the Castle are spaces for the St. Isidore Libraries that specialize in web resources, followed by St. Thomas Libraries that specialize in online encyclopedias, followed by St. Jerome Libraries that specialize in books, and so on. This order matches the GenSpec Model that game play is meant to teach game players (see section 3.1).

3.4.5 The Game Board's Other Game Spaces

The game includes other spaces that make the game-play experience more varied, reinforce the game's setting during the Black Death, and give players opportunities to learn more about library research. Table 3.2 lists 11 other game space types and scenarios that could happen to game pieces landing on them.

Table 3.2. Other Game Spaces

Space name	Function	Likely scenarios
Castle of the Duke	Serves as starting point and payment site for active teams	Game pieces start at the Castle of the Duke space. Teams are rewarded with 40 gold for passing the Castle and 80 gold for landing on the Castle. (See appendix H for the text that the game displays to teams landing on this space.)
Fox Hunt	Puts game pieces in the Hospital	The Fox Hunt describes an accident that automatically sends the team's game piece to the Hospital. Team members click their game piece and the Hospital gives them a task to determine whether they are fit for release. The Hospital requires players to complete a task at campus libraries to earn their release. (See appendix C for Hospital Tasks and appendix H for the text that the game displays to teams landing on this space.)
Garrison	Affects a team's progress in the game in a negative or positive way	Generally, a stopover improves the team's standing in the game; however, there are sometimes negative consequences to landing on the Garrison. On occasion, the positive impact of a game piece stopover is felt later in the game. (See Appendix D for a list of Garrison cards.)
Hospital	Learn how U-M librarians and library resources can help players satisfy their information needs	Landing on the Fox Hunt space lands teams' game pieces in the Hospital. Hospital tasks require players to visit any or a specific U-M Library and ask the librarian a question. Some questions pertain to the particular library's collections vis-à-vis the medieval era of the Black Death and other questions pertain to players' coursework, major, or personal interests. Librarians give players a code to type into the game to earn their release from the Hospital. (See Appendix C for a list of Hospital tasks.)
Library Study	Follow search hints to learn about using search engines on the web and at the U-M Library's gateway	Library Study gives teams an opportunity to familiarize themselves with the features of the many search engines they may encounter during game play. If teams do not know the answer to the question, search hints are given to encourage players to take the search engine for a test drive and experiment with it in ways that enable them to answer the question. The game subtracts 2 gold for a team's wrong answers. (See appendix E for a list of Library Study questions.)
Manor House	Rest	Teams pay and earn nothing except for a well-deserved rest from game action. If a team has in its possession the "Water Wheel" card from the Oracle, the team earns 5 gold. (See appendix H for the text that the game displays to teams landing on this space.)
Oracle	(Same as Garrison above)	Same as Garrison above but the majority of scenarios has a negative impact on a team's progress. (See Appendix F for a list of Oracle cards.)
Public House	Join in fellowship that costs your team gold	Joining the fellowship at the public house space always costs a team 5 gold. (See appendix H for the text that the game displays to teams landing on this space.)

Space name	Function	Likely scenarios
Sage Advice	Follow search hints to learn about ready reference sources on the web and through the U-M Library's gateway	Use ready reference sources such as dictionaries, almanacs, timelines, biographies, and reviews to find answers to factual questions about the Black Death. Questions include hints to help teams navigate to and use the ready reference source to answer the question. Teams pay 2 gold for a question. Teams that give incorrect answers must pay an additional 2 gold. (See Appendix G for a list of Sage Advice questions.)
Tavern	Join in revelry that costs your team gold	Joining in the revelry at the tavern costs a team 5 gold. (See appendix H for the text that the game displays to teams landing on this space.)
Well	Toss gold into the well to make a wish or collect the gold others have tossed in	Teams toss 5 gold into the well each time they land on the space. A team may receive an Oracle or Garrison card that lets them claim all of the gold that has accumulated in the well. (See appendix H for the text that the game displays to teams landing on this space.)

What happens when a team's game piece lands on the Fox Hunt is unique. The Fox Hunt scenario describes an accident that automatically sends the team's game piece to the Hospital. Team members click their game piece and the Hospital gives them a task to determine whether they are fit for release. Most tasks require players to visit a U-M Library and ask a librarian a question. Some questions pertain to the particular library's collections vis-à-vis the medieval era of the Black Death and other questions pertain to the library's collections vis-à-vis the player's coursework, major, or personal interests. When players complete the task, they ask the librarian for a release code, sign onto the game, type the code into the box, and the game releases them from the Hospital. Project team researchers developed Hospital tasks with the assistance of U-M librarians. Examples of Hospital tasks are:

- Go to any campus library. Ask the reference librarian to pretend that she or he has just given you a comprehensive tour of their library's resources and services. Ask them to summarize by telling you the three most important things that you should remember about their library.
- Go to the Askwith Media Library and ask the librarian to show you how to find (a) media that depicts conditions during the time of the Black Death or (b) media on a topic of personal or academic interest.
- Go to any campus library, introduce yourself to the reference librarian, tell her what interests you (personal or academic interests), and ask her or him to show you how to find library resources that pertain to your interests.

The game's response to game pieces landing on Library Study or Sage Advice spaces is almost the same as their landing on monastery library spaces. The major difference is that players do not earn scrolls for correct answers to Library Study or Sage Advice questions.

3.4.6 The Game's Question-and-Answers Database

During game play in fall 2007 (see section 4), the Storygame Project team served as game administrators. Project team members signed onto the game's administrative interface and assigned game players a game piece. The administrative interface was only available to the Storygame Project team. The administrative interface enabled us to play the role of game administrators and attend to project business. For example, we could add new teams and game boards to the game, and we could add, edit, and delete the questions,

scenarios, and tasks. Figure 3.2 shows the storygame’s administrative interface for handling project business connected with the teams playing the *Defense of Hidgeon*.

Figure 3.2. Handling teams in the storygame’s administrative interface

Teams List

[New team](#)

Filter on team :

Number of teams found : 19

Page : 1 2

Team Name	Board ID	
valiant	7	Show
blue	6	Show
victors	6	Show
redNinjas	6	Show
InfoHunters	6	Show
maize	6	Show
conquerors	7	Show
heroes	7	Show
wolverines	7	Show
warriors	7	Show

In figure 3.2, the Teams List displays the names of existing teams and the game boards on which they play. Clicking on the “New team” link allowed administrators to add new teams. Clicking on the “Show” links produced a detailed display of a team’s progress to date that the Storygame Project team could monitor during game play. The display showed the number of scrolls the team had earned, the number of questions the team answered to earn each scroll, the team’s assets in terms of gold and exclusive licenses, the number of challenges the team had won and lost, and the number of correct and incorrect answers the team had given to questions. On the far left was a panel bearing links on which administrators could click to accomplish a wide variety of administrative tasks. Links under the “Edit Cards” heading allowed them to edit, add, and delete scenarios on Sage Advice and Oracle cards. Links under the “Edit Hospital Tasks” heading allowed them to edit, add, and delete Hospital tasks. Under the “Edit Users” heading were links for adding new teams and administrators.

Links under the “Challenge” heading allowed administrators to edit ratings for bibliography entries and to edit, add, and delete challenge scenarios. Under the “General” heading were links for editing, adding, and deleting news items that the game displays to players at login and for monitoring teams’ answers to questions.

Links under the “Edit Questions” heading allowed administrators to edit, add, and delete questions for monastery library, Sage Advice, and

Library Study game spaces. Formulating these questions was a major development effort of the Storygame Project team. For monastery library questions, the project team searched the web and online databases through the U-M Library’s gateway. Finding a source that addressed a specific Black Death subtopic, they formulated a question and answer from the information they read on a web page, in an encyclopedia article, book, edited work, or journal article. They continued searching for entries with similar titles that did not answer the question so that they could list these entries along with the correct entry. Unabridged lists of web, encyclopedia, book, edited work, database, and journal article database, and citation database questions are in appendixes I, J, K, L, M, and N, respectively.

The Storygame Project team paid great attention to wrong answers to make sure their titles addressed the question at hand so that game players were less likely to guess at answers and more likely to use hints to find listed entries and scan their text for answers. Here is an example of a question that a game player could encounter upon landing on a St. Jerome space where the monastery libraries specialized in books:

- After building a comfortable level of understanding with encyclopedias, start with this book because its author summarizes what is known about the Black Death from the many books, journal articles, book chapters, and conference papers that have been written on this topic to date.

The project team identified these citations to books as possible answers to this question:

- A. Benedictow, Ole J. (2004). *The Black Death, 1346–1353: The complete history*. Woodbridge Suffolk: Boydell Press. [Call number: GRAD RC 175 .B461 2004]
- B. Ziegler, Philip. (1969). *The Black Death*. New York: J. Day. [Call number: GRAD RC 178 .A1 Z66]
- C. Deaux, George. (1969). *The Black Death, 1347*. New York: Weybright & Talley. [Call number: GRAD RC 178 .A1 D28 1969]

Filling in a radio button (for 1-answer questions) or checking a box preceding each answer (for 2- or 3-answer questions) was the way in which players submitted their answers to the game. The game gave no feedback to players who gave incorrect answers. The game was programmed *not* to present the same question to teams until they exhausted all questions of a particular type, e.g., all books questions, all web questions, etc. The game gave a confirmation to players who submitted correct answers to questions. Here is an example of the confirmation the game gave to players who answered the above question correctly:

Correct Answer: B

Answer Description: Ziegler's book. If something about the Black Death interests you, note the sources that Ziegler cites and read them for more detail. Because Ziegler's book was published in 1969, you'll have to consult more recent books for new themes, issues, and controversies about the Black Death.

The confirmation included a list of the three sources the game added to the team's bibliography. In this case, the three sources would be the same ones as the possible answers A, B, and C to the original question. Sources could also be ones that game players would be likely to encounter in a search for answers to the question.

When the project team added sources to the question-and-answers database, they rated them according to their (1) discipline, (2) audience, and (3) credibility. The team had these four choices for discipline: (1) humanities, (2) social sciences, (3) medical sciences, or (4) sciences generally. They had these five choices for audience: (1) from 4th grade up, (2) from 9th grade up, (3) from college up, (4) from college majors up, and (5) scholars and scientists talking primarily to their peers. Their choices for credibility were (1) low, (2) medium, and (3) high. These ratings figured into the game's challenge functionality (see subsection 3.4.10).

The project team formulated Sage Advice questions in the same way. They searched the web and online ready reference sources at the U-M Library's gateway. Finding a source that addressed a specific Black Death subtopic, they formulated a question and answer from the information they read on a web page or in the ready reference source. They continued searching for entries with similar titles that did not answer the question so that they could list these entries along with the correct answer. Project team members paid great attention to wrong answers to make sure their titles addressed the questions so that game players were less

likely to guess and more likely to use hints to find listed entries and scan their text for answers. The project team did not rate Sage Advice sources because they did not figure into the bibliographies that game players consulted during challenges. Examples of a Sage Advice question and possible answers are:

- China may have been the original source of the plague that decimated European populations in the mid 14th century. Where would you look for the most up-to-date information on China's current population and the population of other countries around the world?
- A. CIA Factbook (on the web)
 - B. Global Statistics (on the web)
 - C. Infoplease (on the web)

Game players who chose answer A received this confirmation from the game:

Your answer is correct! The abbot of the monastery beams with pleasure. He can tell you are a careful and devout scholar. Once the monks are confident in your research ability, they'll grant you complete run of the stacks and a plan to fight the plague won't be far off!

Answer Description: A. CIA Factbook. For the most up-to-date population statistics, consult the CIA Factbook. Global Statistics cites the CIA Factbook and Infoplease gives an estimate.

To develop Library Study questions, project team members scrutinized the functionality of the many search engines game players were likely to use to answer monastery library questions such as Google, Yahoo!, JSTOR, Gale Virtual Reference Library, ISI Web of Science, and the U-M's MIRLYN online catalog. They formulated questions that queried game players about how these search engines worked and added hints so that game players would take these search engines for a test drive to answer questions. Like Sage Advice questions, the project team did not rate Library Study sources because they did not figure into the bibliographies game players consulted during challenges. The following example of a Library Study question includes search hints to help players navigate directly to search engine sites and take them for test drives to answer the question.

- To find book reviews, consult these sources:
- A. Amazon (on the web at <http://www.amazon.com/>)
 - B. Mirlyn (at the U-M Library at <http://mirlyn.lib.umich.edu/>)
 - C. Book Review Index Online. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," enter "book?" into the box, and choose "Book Review Index Online")

Game players who chose answers A and C received this confirmation from the game:

Your answer is correct! The abbot of the monastery beams with pleasure. He can tell you are a careful and devout scholar. Once the monks are confident in your research ability, they'll grant you complete run of the stacks and a plan to fight the plague won't be far off!

Question Answer: A and C. Only Mirlyn doesn't have book reviews. Amazon features published reviews and reviews volunteered by readers. Book Review Index Online features published reviews only.

To add questions to the game, project team members entered the game's administrative interface and

clicked on the “Monastery Questions” link (see figure 3.2). The interface responded with a list of monastery library questions (figure 3.3). It listed about 10 questions with links to edit, destroy, or show the question to administrators for review.

Figure 3.3. Monastery questions list from the administrative interface

For the sake of example, let’s say that the administrator clicks the “show” link in figure 3.3 for the fourth entry, i.e., books question #154. The administrative interface’s response is the display in figure 3.4 showing the question, possible answers, correct answer, and source identification numbers that the game assigned to the bibliography entries for the challenge. Had the administrator clicked on the “Edit” link in figure 3.3, the administrative interface would have displayed the same information as figure 3.4 in an editing window into which the administrator could place the mouse’s cursor to edit the information. Clicking on the “Edit” link at the bottom of figure 3.4 would also lead to an editing window.

Monastery Questions List			
New question			
Filter on question : <input type="text"/>			
Number of questions found : 103			
Page : 1 2 3 4 5 6 7 8 9 10 11			
ID	Source Type	Question	
151	Encyclopedias	Convenience is the reason to start your research on the Black Death with the web. What are two reasons to continue your research with encyclopedias?	Show Edit Destroy
152	Encyclopedias	What is so special about the bibliographies at the end of encyclopedia articles including ones on the Black Death?	Show Edit Destroy
153	Encyclopedias	After exhausting online encyclopedias, where can you go to find more encyclopedias?	Show Edit Destroy
154	Books in Mirlyn	After building a comfortable level of understanding with encyclopedias, start with this book because its author summarizes what is known about the Black Death from the many books, journal articles, book chapters, and conference papers that have been written on this topic to date.	Show Edit Destroy
155	Books in Mirlyn	Why read the many books that survey themes and subtopics connected to the Black Death such as its origins, nature, clockwise sweep through Europe, the flagellant movement, and the persecutions of the Jews, when you save time reading about these same themes in much shorter encyclopedia articles?	Show Edit Destroy
156	Books in Mirlyn	Because so many books' authors, e.g., Byrne, Deaux, Gasquet, Gottfried, Ziegler, survey the same Black Death themes, for example, the origin of the disease, its nature, clockwise sweep through Europe, the flagellant movement, and the persecutions of the Jews, in their books, why should you bother to read more than one of their books?	Show Edit Destroy
157	Books in	Which book author(s) insert primary documents such as first-person accounts of living and experiencing daily life	Show Edit Destroy

Figure 3.4. Question and answers for administrative review

Source Type: Books in Mirlyn

Question: After building a comfortable level of understanding with encyclopedias, start with this book because its author summarizes what is known about the Black Death from the many books, journal articles, book chapters, and conference papers that have been written on this topic to date.

Source Choice A: Benedictow, Ole J. (2004). *The Black Death, 1346–1353: The complete history*. Woodbridge Suffolk: Boydell Press. [Call number: GRAD RC 175 .B461 2004]

Choice A Source ID: 1120

Benedictow, Ole J. (2004). *The Black Death, 1346–1353: The complete history*. Woodbridge Suffolk: Boydell Press. [Call number: GRAD RC 175 .B461 2004]

Source Choice B: Ziegler, Phillip. (1969). *The Black Death*. New York: J. Day. [Call number: GRAD RC 178 .A1 Z66]

Choice B Source ID: 1121

Ziegler, Phillip. (1969). *The Black Death*. New York: J. Day. [Call number: GRAD RC 178 .A1 Z66]

Source Choice C: Deaux, George. (1969). *The Black Death, 1347*. New York: Weybright & Talley. [Call number: GRAD RC 178 .A1 D28 1969]

Choice C Source ID: 1122

Deaux, George. (1969). *The Black Death, 1347*. New York: Weybright & Talley. [Call number: GRAD RC 178 .A1 D28 1969]

Correct Answer: B

Answer Description: Ziegler's book. If something about the Black Death interests you, note the sources that Ziegler cites and read them for more detail. Because Ziegler's book was published in 1969, you'll have to consult more recent books for new themes, issues, and controversies about the Black Death.

[Edit](#) | [Back](#)

3.4.7 Playing the *Defense of Hidgeon*

Let's test drive *Defense of Hidgeon* game play. Figure 3.5 shows the full game environment that loads in the player's Firefox web browser when they log into the *Defense of Hidgeon*.

Figure 3.5. Defense of Hidgeon in the Firefox browser window

On the top left is the Site Navigation window where links are listed on which game players can click to learn about their team's progress to date (see also figure 3.23). Under Site Navigation are the Dashboard and Backpack tabs. On the Dashboard is all essential information pertaining to a team's game piece specifically and team progress generally. In the Backpack are game assets one's team has earned to date. In figure 3.5, the Backpack shows that we are taking a test drive of the *Defense of Hidgeon* as the "yellow" team. The "yellow" team has earned 17 scrolls to date and only needs to earn 1 scroll at a monastery library that specializes in books.



The game board resides to the right of the Site Navigation window and Dashboard and Backpack tabs. Game pieces start on the top left at the Castle of the Duke and move in a clockwise direction on a path that looks like the letter "B." Game pieces depict a character of the medieval period, i.e., sheep, peasant man, peasant woman, horse, lute, rat, wheelbarrow, or knight. When players roll their cursor over the game board, popup windows describe the duchy landmarks underneath the cursor. For example, in figure 3.5, our last roll of "6" lands our "peasant" game piece on the Rook House Library of St. Albert. The grey flag in front of the Rook House Library indicates that no team owns an exclusive license to this library. Should we roll the cursor over the library, the game displays the popup in Figure 3.6.

Figure 3.6. Rook House Library of St. Albert popup

The popup cites the library's name, owning team (in this case, no team owns it), and what resource type players would search to answer its questions (in this case, Databases).

Our next step is to click our "peasant" game piece. The game responds with a message telling us that our team has earned all scrolls for this library type (i.e., databases) and inviting us to purchase the library (figure 3.7).



Figure 3.7. Purchasing the Rook House Library of St. Albert

Because purchased libraries improve their team's standing in the game, the yellow team spends 15 of its 117 gold to purchase the Rook House Library.

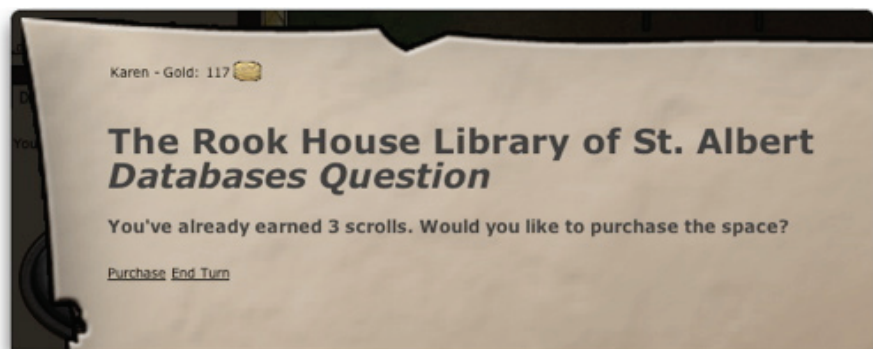


Figure 3.8. Rook House Library's yellow flag

When teams purchase libraries, the flags match the purchasing team's color. The yellow team's purchase of the Rook House Library results in the raising of the yellow flag in front of this library (figure 3.8).

Our team's next step is to roll the dice to propel the peasant man game piece forward. The yellow team's major objective is landing on a monastery library game space that specializes in books, answer its question correctly, and, thus, earn our quota of 18 scrolls, 3 for each of 6 library types.



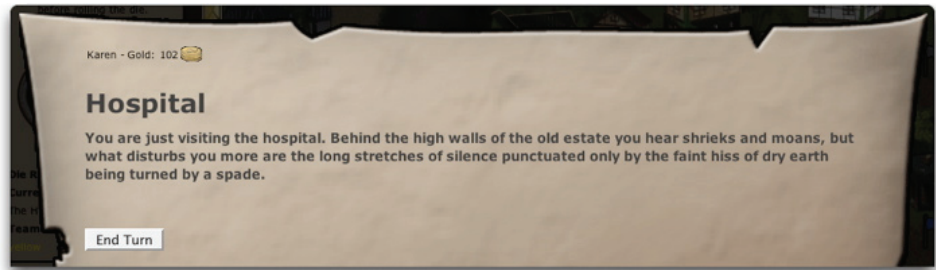
Figure 3.9. Hospital visit popup

The roll of the die propels the yellow team's peasant man game piece forward to the Hospital (figure 3.9). Hovering the mouse over the Hospital game space results in a popup that identifies the Hospital and displays a storyline that reflects the game's Black Death theme. Because a roll of the die lands the yellow team's game piece in the Hospital, this is considered merely a visit to the Hospital and no Hospital task is given (figure 3.10).



Figure 3.10. Hospital visit scenario

The player clicks the “End Turn” button in figure 3.10 and leaves the Hospital by rolling the die. Several rolls of the die later, the yellow team’s peasant game piece lands on the Garrison. Hovering over the Garrison space produces the familiar popup that identifies the space. Clicking on the game piece produces a scenario (figure 3.11). In terms of consequences, this Garrison scenario is a combination of positive (i.e., taking all the gold in the well) and negative (i.e., waiting 2 minutes to resume game play).

**Figure 3.11. Garrison scenario****Figure 3.12. Fox Hunt popup**

After 2 minutes passes, the yellow team rolls the die that propels our peasant game piece forward to the Fox Hunt. Hovering over the Fox Hunt space produces the familiar popup that identifies the space (Figure 3.12).

When we click on our game piece, we learn the unfortunate consequence of landing on the Fox Hunt space (figure 3.13). During the hunt, we have fallen off our horse and broken a leg. The game automatically relocates our game piece in the Hospital where a surgeon can set the break. Figure 3.14 shows our game piece’s relocation to the Hospital.



Figure 3.13. Fox Hunt scenario

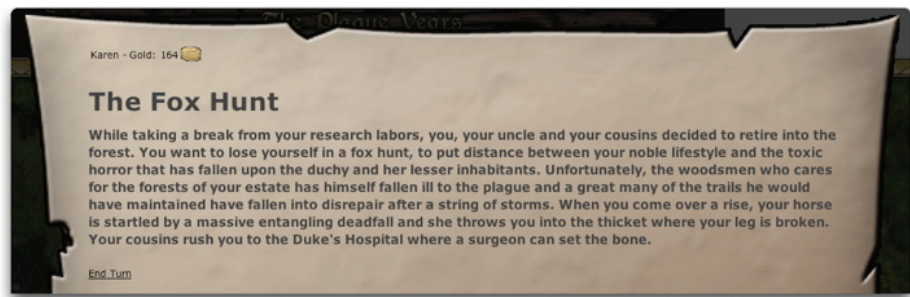


Figure 3.14. Relocating the peasant game piece to the Hospital with popup

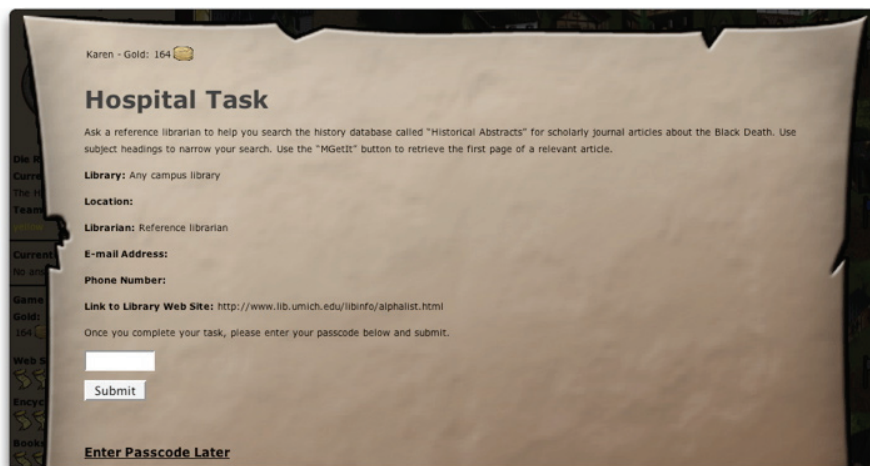
The Hospital popups for visits and stays are the same (see figures 3.9 and 3.14).

What is different is the scenario. Instead of merely visiting the Hospital, we must complete an assignment at a campus library to earn our release from the Hospital. Clicking our peasant game piece reveals the scenario (figure 3.15). The game requires the yellow team to visit any campus library and ask the librarian to help them search the online Historical Abstracts for a scholarly journal article on the Black Death and use MGetIt to retrieve the full text of an article.

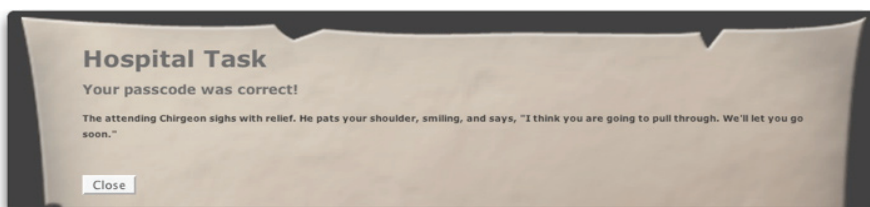


Figure 3.15. Hospital scenario

When we game players and librarian finish the task, the librarian gives us a code #948218, and we type it into the dialog box in figure 3.15. The code releases us from the Hospital. Figure 3.16 displays the Hospital release message. Now the game lets us roll the die to propel our peasant man game piece forward.

**Figure 3.16. Hospital release message**

Released from the Hospital, our yellow team is anxious to move forward as quickly as possible, trying to land on monastery library spaces that specialize in books so we can earn the last scroll. Rolling the die moves our game piece forward 1 to a Library Study space. We click on the game piece to see the question that awaits us (figure 3.17).

**Figure 3.17. Library Study question**

Coincidentally this Library Study question pertains to using the MGetIt function that figured into the Hospital task in figure 3.15. Because we recall using MGetIt to earn our release from the Hospital, we do not have to search Historical Abstracts and instead choose the question's third-listed answer pertaining to finding digital texts. Although the game issues questions randomly, here is one instance when answering one question helps to answer a subsequent one.

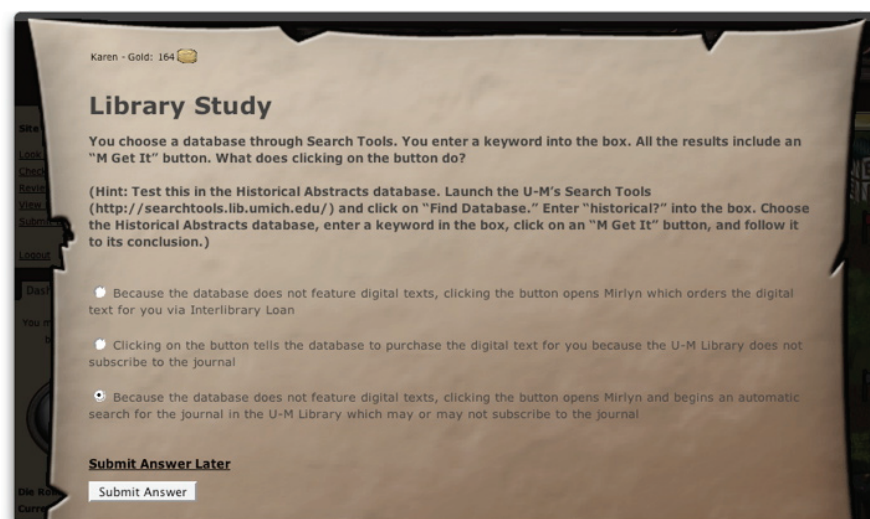


Figure 3.18. Library Study answer

Figure 3.18 gives game players feedback confirming their correct answer. Teams do not earn scrolls for their correct answers to Library Study questions but they do earn credit for correct answers that raise their overall score in the game, thus, it is important that they strive for accuracy when giving answers to both Library Study and Sage Advice questions.

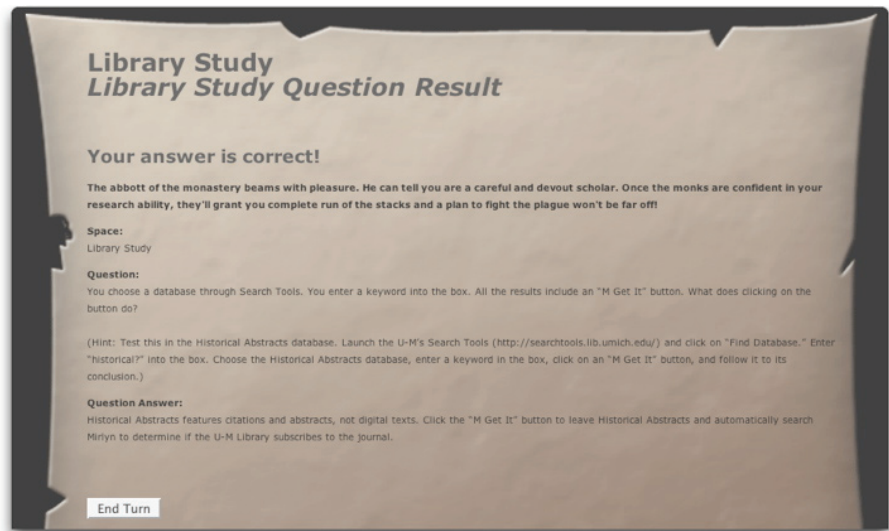


Figure 3.19. Eastern Oracular Library of St. Jerome popup

It takes a few more rolls of the die for our yellow team to land on the Eastern Oracular Library of St. Jerome (figure 3.19). This library specializes in book questions. Hovering over this game space produces the familiar popup that identifies the space.

When we click on our game piece, the game responds with the question in Figure 3.20. The question asks the team to select one of three listed books in which the author analyzes numerical data to estimate a 60% change in certain countries' populations.

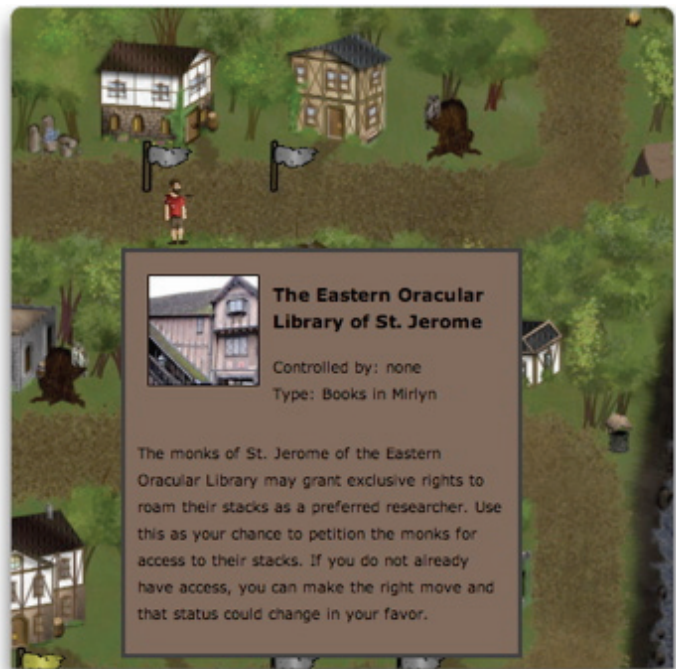


Figure 3.20. Answering a question about books at the Eastern Oracular Library

We have to visit the U-M Library to examine the three books listed as possible answers in order to answer this question correctly.

To facilitate this task, the Storygame Project team put all books cited in the game's questions on reserve. For this question especially, where the books that might have the answer to the question are located at three different libraries (i.e., Public Health, Graduate, and Undergraduate Libraries), we game players only need to visit one location — University Reserves at the Undergraduate Library. Dutifully, we visit reserves, examine listed texts, and single out Benedictow's *Complete History* as the likely answer. In response to our selection of Benedictow's text (the second-listed answer in figure 3.20), the game responds with feedback confirming that this selection is correct in figure 3.21.

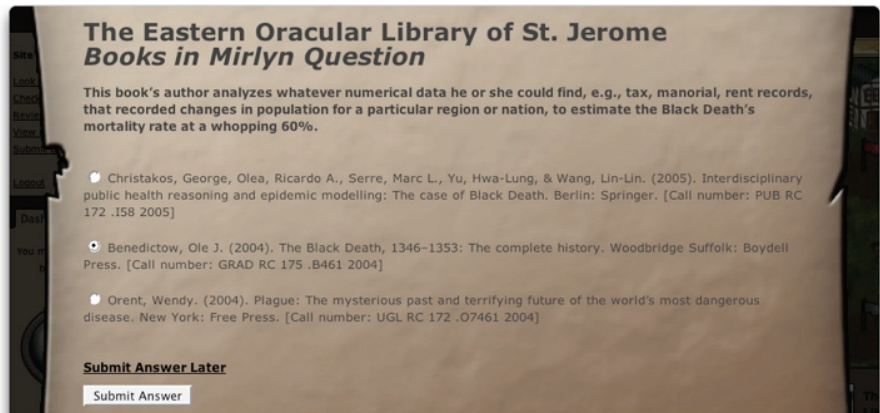


Figure 3.21. Correct-answer feedback for the question about books

Feedback also informs us that it is adding the three books that are possible answers to this question to our team's Bibliography. We will be able to use these added bibliography sources during a challenge at a later time in the game.

Because no team owns this library, we have the option of purchasing this monastery library. Clicking on the "Purchase" link in figure 3.21, we purchase an exclusive license to the Eastern Oracular Library of St. Jerome for 9 gold (see Table 3.1 for purchase prices). In the future, players on opposing teams who land on the Eastern Oracular Library will pay a "landing fee" of 3 gold to the yellow team. Scrolling to the bottom of the feedback message reveals a message that tells the yellow team they can now retire from the game because they have collected their quota of 18 scrolls, 3 for each of the game's 6 monastery library types (figure 3.22).

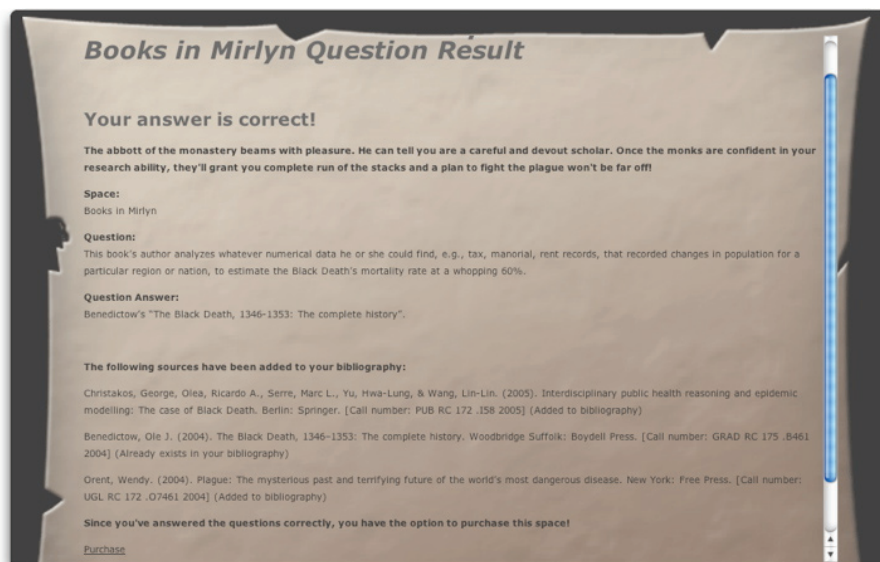
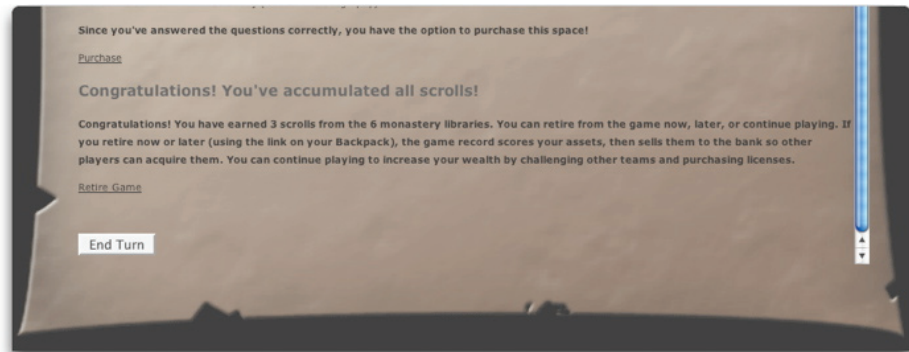


Figure 3.22. Game-retirement option

When a team retires, the game exchanges the value of their team's assets for the same amount in gold. Although retired teams no longer receive fees from opposing teams who land on their monastery libraries, they do not risk losing a monastery library license through a challenge. Teams that earn all 18 scrolls do not have to retire. They can still play the game, striving for accurate answers to Library Study and Sage Advice questions, collecting fees from active teams that land on their monastery libraries, and responding to challenges.



3.4.8 Monitoring One's Team Progress during Game Play

Teams can monitor and assess their progress vis-à-vis opposing teams using functionality in the Site Navigation window (figure 3.23).

Figure 3.23. Site Navigation window

This window's links for looking at a Team Report Card and for checking Leaderboard Standings can help teams assess their standing in the game. The Report Card link includes a message telling teams how accurate they have been answering questions (figure 3.24).



To date, the yellow team has answered 73.2% of its questions correctly. For specific question types, accuracy ranges from a low of 60% (i.e., answering 3 of 5 web questions correctly and 3 of 5 books questions correctly) to a high of 100% (i.e., answering all 3 database and all 3 citation database questions correctly).

Figure 3.24. Yellow Team's Report Card

Clicking on the Site Navigation window's "Show Leaderboard Standings" displays the Leaderboard (figure 3.25). The Leaderboard lists the top teams, game board, and scores. Karen, Xingxing, and Beth are playing on the "Kings" game board. Karen is playing the yellow team's game piece and is in the lead with 12,765 points. Only 466 points separate Xingxing and Beth who are in second and third places, respectively. Karen has the maximum scroll score of 12,600. She can increase her score by issuing challenges and purchasing exclusive licenses to unowned monastery libraries. Xingxing and Beth can do the same while earning the game's quota of 18 scrolls.

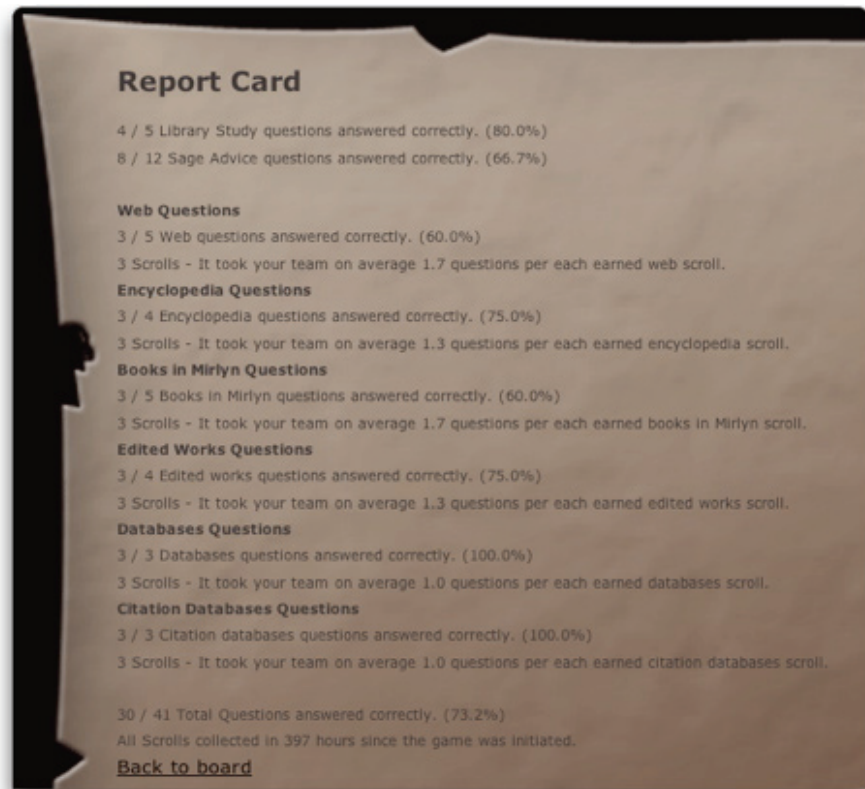


Figure 3.25. Leaderboard

Color	Team Name	Gold Score	Scroll Score	Territory Score	Time Penalty	Total Score	Game Board
	Karen	225	12600	850	-910	12765	kings
	Xingxing	271	11200	450	-374	11547	kings
	Beth	224	11400	950	-1493	11081	kings

3.4.9 Scoring the Game

Teams are ranked on the Leaderboard according to their “Total Score” that is based on many aspects of team performance. When calculating a team’s Total Score, the game takes these 5 values into account: (1) average percentage of questions answered correctly, (2) the value of a team’s gold, (3) the value of a team’s scrolls, (4) the value of the exclusive library licenses that a team owns, and (5) a time fee. The objective of the total-score formula is to reward teams that answer questions correctly, earn monastery library scrolls, play efficiently, purchase exclusive licenses to monastery libraries, and amass gold.

In figure 3.25, the Leaderboard shows Karen’s yellow team with a Total Score of 12,765. Let’s dissect the 5 values that make up this Total Score.


The first component is question-answering accuracy percentages. These percentages are displayed in the yellow team’s Report Card (figure 3.24). For example, the yellow team has answered 4 of 5 Library Study questions correctly, or 80%, 8 of 12 Sage Advice questions correctly, or 66.7%, and 3 of 5 web questions correctly, or 60.0%. An overall average percentage correct figure is calculated by averaging together each of these individual percent correct figures and, if applicable, the percent of challenges won. Therefore, the yellow team’s overall average percent correct is 77.09% $((80 + 66.7 + 60 + 75 + 60 + 75 + 100 + 100)/8)$.

Figure 3.26. Yellow team’s dashboard

The second component involves the value of the gold that the yellow team has amassed. This value of 293 is displayed on the yellow team’s dashboard (Figure 3.26). To calculate the gold that counts toward the yellow team’s Total Score, the game multiplies 293 by the overall average percent correct figure (77.09%) resulting in a gold value which for the purpose of score calculation is 225. The Leaderboard (figure 3.25) displays this value as the yellow team’s “Gold Score.”

The third component is the value of the scrolls that the yellow team has earned to date. These values are based on the cost of a question and the landing fee. To calculate these values, the game uses data from the team’s dashboard that shows that the yellow team has earned all 18 scrolls (figure 3.26). Web scrolls are each worth 2 points so the team’s web scroll value is 6, encyclopedia scrolls are each worth 4 points so the team’s encyclopedia scroll value is 12, books scrolls are each worth 6 points so the team’s books scroll value is 18, and so on.

Dashboard
Backpack



ROLL DIE

Roll


Die Roll:


Current Space:
The Eastern Oracular Library of St. Jerome


Team's Color:
yellow


Current Question
No answer pending


Game Status


Gold:
293 


Web Scrolls:


Encyclopedias Scrolls:


Books in Mirlyn Scrolls:


Edited Works Scrolls:


Databases Scrolls:


Citation Databases Scrolls:


Logout

A team's total scroll value is calculated by multiplying the number of scrolls for each library type by the point value for that type of scroll and summing these products. The end result of this calculation is then multiplied by 100 in order to provide heavier weighting to this component of the Total Score calculation. Thus, the yellow team's scroll value is 12,600 ($100 * ((3*2) + (3*4) + (3*6) + (3*8) + (3*10) + (3*12))$). The Leaderboard (figure 3.25) displays this value as the yellow team's "Scroll Score."

Figure 3.27. Yellow team's backpack

The fourth component of the yellow team's total score is the value of its exclusive library licenses. The data for this calculation is displayed in the team's backpack (Figure 3.27).

The backpack shows the yellow team owns exclusive licenses to 4 libraries. The point values for each library are based on the cost of purchasing a license. The yellow team purchased the St. Isidore Library for 5 gold, the 2 St. Albert Libraries for 25 gold each, and the 1 St. Dominic de Guzman Library for 30 gold.

A team's total territory score involves the cost of the license (summarizing "Pay for a question," "Landing fee," and "Purchase or Challenge fee" columns in Table 3.1). This score is calculated by multiplying the number of library licenses by the cost of the license. The end result of this calculation is then multiplied by 10 to provide the appropriate relative weighting to this component of the score calculation. Thus, the yellow team's library licenses-owned value is 850, or $(10 * ((1*5) + (2*25) + (1*30)))$. The Leaderboard (figure 3.25) displays this value as the yellow team's "Territory Score."

The last component of the yellow team's Total Score is a time fee. For each hour that elapses between the time that the game starts for all teams and the time when a team retires or the game ends for all teams, the game assesses a fee of 10 gold. This fee is adjusted by each team's average percent of incorrect answers, thus, the game assesses teams with many incorrect answers a much larger time fee than teams with few incorrect answers. No time fee is imposed on teams that answer all questions correctly.

The yellow team's Report Card (Figure 3.24) shows that 397 hours has elapsed since the game started and the time at which the screenshot was taken. Since the yellow team's overall average percent correct is 77.09%, its average percent incorrect is 22.91% ($100 - 77.09\%$). Thus, the yellow team is assessed a time fee of 910 ($397 * 10 * 22.91\%$). The Leaderboard (figure 3.25) displays this value as the yellow team's "Time Penalty."

Finally, the game calculates a team's total score by summing its Gold Score, Scroll Score, and Territory Score, and subtracting the team's Time Penalty. The yellow team currently has a Total Score of 12,765 ($225 + 12,600 + 850 - 910$). The Leaderboard (figure 3.25) displays this value as the yellow team's Total Score.



3.4.10 The Game's Challenge Functionality

Challenge functionality was the last major development that the project team added to the game. The challenge adds interactivity to the game and stimulates game players to think about the sources that they encounter when answering monastery library questions and make decisions about how these sources would apply to real information-seeking episodes.

The challenge is the most potent offensive strategy that the yellow team can use to increase its lead over the opposing red and blue teams (see sections 3.4.7 to 3.4.9 for yellow-team game play). Other strategies such as answering Library Study and Sage Advice questions and collecting fees from opponents who land on monastery libraries owned by the yellow team will not add substantially to the lead that this team has over its opponents. To win a challenge, game players respond to a scenario by choosing sources in their team's bibliography that reflect a particular discipline, address the scenario's audience, and exhibit high standards with respect to credibility.

To initiate a challenge, a team's game piece lands on a monastery library space to which an opposing team owns an exclusive license. The team pays the landing fee to the owning team. If the team has not yet earned its quota of scrolls from this type of library, the team answers a question. If its answer is correct, the team takes the second of these two potential next steps: (1) rolling the die to continue its journey through the village or (2) challenging the owning team for its exclusive license to the library.

Briefly, here is what happens during a challenge. The challenging team issues a challenge to the owning team. The owning team has four days (96 hours) to respond to a challenge or lose its exclusive license to the library. The game issues a scenario to both challenging and owning teams. The scenario describes a difficult situation that Duke Jerome must address. Most scenarios require teams to provide the duke with information to keep the duchy's population from panicking over the dangerous encroachment of the Black Death. Instead of giving the duke a direct answer, challenging and owning teams select the three best bibliography sources from their team's bibliography that would prepare him for solving the problem. On both teams' dashboards are notifications of incomplete challenges.

Using ratings that the project team assigned to sources during question-and-answer database building (see section 3.4.6), the game rates the two bibliography sources that the two teams submit with respect to these three criteria: (1) discipline, (2) credibility, and (3) audience. If the game rates the sources list from the challenging team higher than the sources list from the owning team, the challenging team takes ownership of the exclusive license to the library. If the game rates sources from owning team higher than or the same as the challenging team, the owning team retains ownership of the exclusive license to the library.

When two teams are involved in a challenge for a library, other teams cannot challenge these teams for the library. The challenge must be resolved before a third team can challenge for the library. During a challenge, all fees collected from third libraries landing on the library are awarded to the original owning team.

To enable the game to automatically score bibliography entries, the project team judged all bibliography entries with regard to discipline, credibility, and audience during the building of the games question-and-answers database (see section 3.4.6). The team examined every source cited in monastery library questions and assigned 1 or 2 disciplines from this list: (a) humanities, (b) social sciences, (c) sciences, and (d) medicine. When scoring the challenge, the game awards 10 points to a team submitting a source that exactly matches the scenario's discipline. If the scenario requires a humanities discipline and the team submits a social science discipline, the game awards 5 points and vice versa. If the scenario requires a sciences discipline and the team submits a medicine discipline, the game awards 5 points and vice versa.

In advance, the project team assigned every source an audience level from this list: (1) education from 4th grade up, (2) education from 9th grade up, (3) education from college up, (4) education from college majors up, and (5) scholars and scientists talking to their peers. The game awards the team 10 points if it submits a source with an audience level exactly matching the scenario's audience level. If the source's audience level does not match the scenario's audience level, the team scores 8 or fewer points, for example, if the scenario's audience level is "4" and the team submits a source with an audience level of "2," the game awards the team 6 points ($10 - ((4-2)*2)$).

In advance, the project team assigned each source a credibility rating of (1) low credibility, (2) medium credibility, or (3) high credibility. Credibility scores for sources submitted during a challenge are calculated based on a 10-point scale, so a team that submits a high credibility source receives the full 10 points while a team that submits a medium credibility source receives $6 \frac{2}{3}$ points ($10 - (10/3)$) and a team that submits a low credibility source receives $3 \frac{1}{3}$ points ($10 - (10/3) - (10/3)$).

Clicking on the link "Review Old Challenge Scores" in the Site Navigation window (figure 3.23) displays the game's scoring rules for challenges (figure 3.28). Teams that review how the game scored the bibliography entries they submitted to challenges might learn how to respond to the three key aspects that figure into challenge scoring, i.e., discipline, audience level, and credibility, and improve their performance in future challenges.

Figure 3.28. Challenge scoring details

Another important link on the Site Navigation window was the "View Manual" (see figure 3.23). Clicking on this link opens the game manual in a new web page. The manual gives a synopsis of the game, the game's backstory that places it in the era of the Black Death, game objectives, brief description of game play, and dozens of glossary entries from A to Z describing important concepts, ideas, terminology, objects, and events that game players are likely to encounter in the Defense of Hidgeon. Words and phrases in capital letters are links to glossary entries in a different place in the alphabet. Figure 3.29 shows the manual open at the CHALLENGE SCENARIO entry. Hidgeon's game manual is posted on the web at <http://storygameproject.org/manual/manual.html>.

Team Challenge List (Your team has won 0 of 1 challenges)

Each source your team submits is scored a maximum of 30 points toward winning the challenge.

Discipline Scoring (10 of 30 points):
Each scenario reflects a particular academic discipline. If your submitted source exactly matches the scenario's discipline, your source earns 10 points. If the scenario requires a humanities discipline and you submit a social science discipline, you get 5 points (and vice versa). If the scenario requires a science discipline and you submit a medical discipline, you get 5 points (and vice versa). All other non-matching disciplines get 0 points.

Audience Scoring (10 of 30 points):
Each scenario is meant for a particular audience. Audiences and their codes are: Education from 4th grade up (1), Education from 9th grade up (2), Education from college up (3), Education from college majors up (4), and Scholars and scientists talking amongst their peers (5). You receive 10 points if you submit a source whose audience exactly matches the scenario's audience. If your source's audience does not match the scenario's audience, you score 8 or fewer points. For example, if the scenario's audience code is 4 and you choose a source bearing audience code 2, you are scored as follows: $10 - ((4-2)*2) = 6$ points.

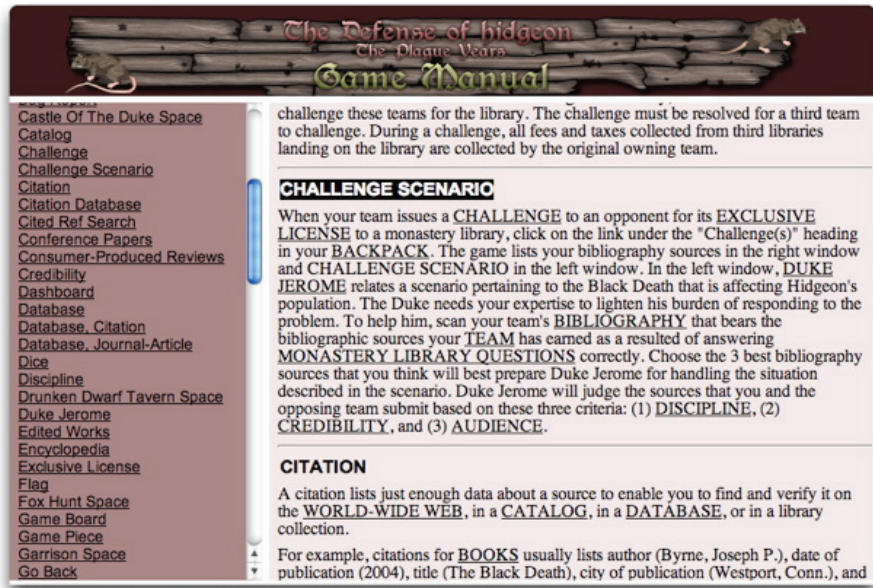
Credibility Scoring (10 of the 30 points):
Each source's credibility rating reflects how credible the source is. The credibility of a source is rated between 1 and 3. The scoring algorithm multiplies a source's credibility by $3 \frac{1}{3}$.

Click on the challenges below to expand more information about them.

Should the two teams in a challenge receive the same amount of points, the original owner of the space reclaims the space as their own and wins the challenge.

A team has 4 days to submit their sources for a challenge starting from the minute the challenge is initiated. If a team does not submit any sources within the 4-day time period, they lose the challenge to their opponent.

Figure 3.29. Game manual entry for CHALLENGE SCENARIO

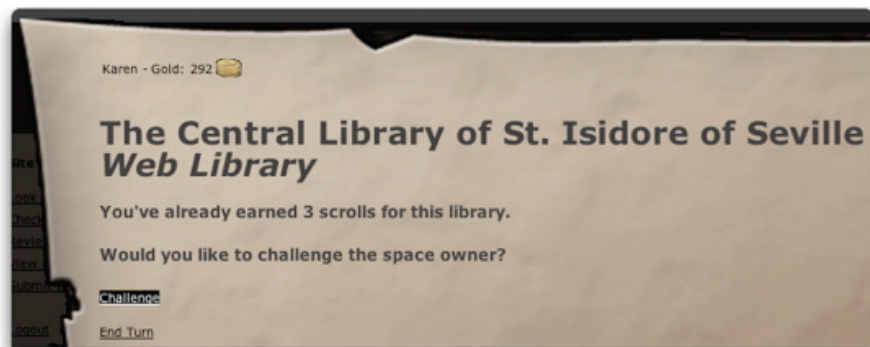


3.4.11 A Challenge Demonstration: Wrestling Game Assets from Opposing Teams

Let's observe a challenge between the yellow and red teams. Landing on the Central Library of St. Isidore of Seville, the yellow team clicks its peasant man game piece and learns that the red team owns this library's exclusive license. In figure 3.30, the game player clicks on the "Challenge" button to issue the challenge.

Figure 3.30. Issuing a challenge

The game initiates a challenge between the challenging "yellow" team and the owning "red" team. Immediately, the challenge interface opens in the challenging "yellow" team's web browser (figures 3.31 and 3.32). This interface consists of two windows: (1) in the left



window is a scenario under which are 3 slots into which the challenging or owning team adds entries from its bibliography that would help the Duke, his council, or Hidgeon citizens generally address the crisis (figure 3.31) and (2) in the right window is a bibliography from which the challenging or owning team selects bibliography sources to submit into the 3 slots on the left (figure 3.32). When teams earn scrolls at monastery libraries, the game builds a team's bibliography adding 3 new sources every time the team answers a monastery library question correctly (see figure 3.21 and section 3.4.7).

Figure 3.31. Challenge left window: Scenario and empty bibliography-entry slots

The game issues yellow and red teams a scenario about answering children’s questions about the plague. Included are hints that suggest sources come from the discipline of science and are appropriate for an audience with an education from 4th grade up. Although the scenario is not explicit about the game’s high standards concerning the credibility of selected sources, the game scores credible sources, that is, ones coming from published sources with author bylines, higher than sources that do not fit these criteria such as sources from the web.

Figure 3.32 shows the challenge interface’s right window. It lists the first 8 of 51 sources in the yellow team’s bibliography. Clicking on the numbers 2, 3, 4, 5, 6, 7 in figure 3.32 shows the remaining sources on subsequent pages. Challenge sources are listed in the order in which teams earn them at monastery libraries on their travels around the game board. Clicking on “title,” “author,” and “source type” links above columns enables teams to sort bibliography entries by these criteria. Clicking on the “Add your notes here” link, players can add notes to individual sources to jog their memories about source content, understandability, or other aspects of interest.

Challenge

Please respond to the following scenario to gain ownership of the **The Central Library of St. Isidore of Seville** space.

Scenario

The local school has invited you in to talk about the basic mechanisms of the plague. What are rats? What are fleas? The children are eager to get a handle on the crisis. Bring you best three sources (and a lot of patience).

Audience's Discipline: Science

Scenario Audience: Education from 4th grade up (1)

Add the three best sources

1. Please add a source from your bibliography.

2. Please add a source from your bibliography.

3. Please add a source from your bibliography.

[Submit Challenge](#) [Submit Challenge Later](#)

Figure 3.32. Challenge right window: Page 1 of the yellow team’s bibliography sources

When players mouse down over titles, the title opens up revealing expanded bibliographic details and notes team members have added to entries. For example, in figure 3.33, the player mouses down over two titles. Because both match the “Science” discipline that the challenge specifies, the player could click on the “Add to Challenge” link accompanying these expanded titles to add these to the challenge. Additionally, both titles come from databases that are sources of published articles.

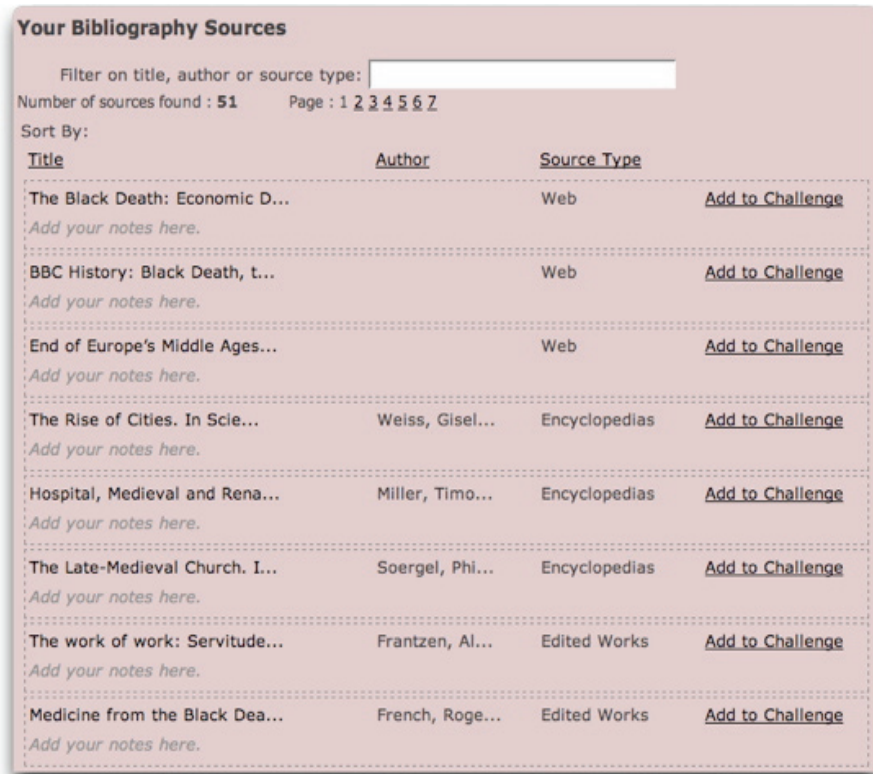


Figure 3.33. Bibliographic details for two bibliography sources

Figure 3.34 shows the 3 titles that yellow team submits to the challenge. The first 2 titles are the ones expanded in figure 3.33. Figure 3.34 shows a third title that yellow-team players found in the list that matches the “Science” discipline. This third title, however, comes from the web where anyone can post information so it might not fare well in the game’s challenge scoring. Links on the challenge window enable teams to remove listed sources, submit selected sources to the challenge at a later time, or submit sources immediately.

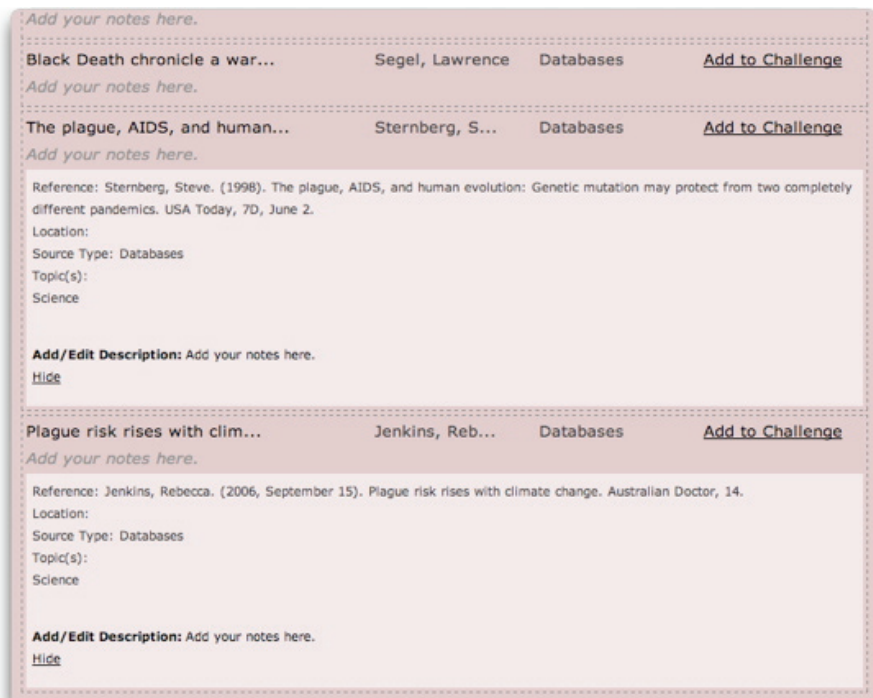


Figure 3.34. Bibliography sources the yellow team submits to the challenge

After double-checking with fellow players, all yellow-team members agree on the choice of sources and click on the “Submit Challenge” button. The game’s feedback about submitted sources is extensive (figures 3.35 and 3.36). It repeats the scenario, lists submitted sources, and tells how it judged them.

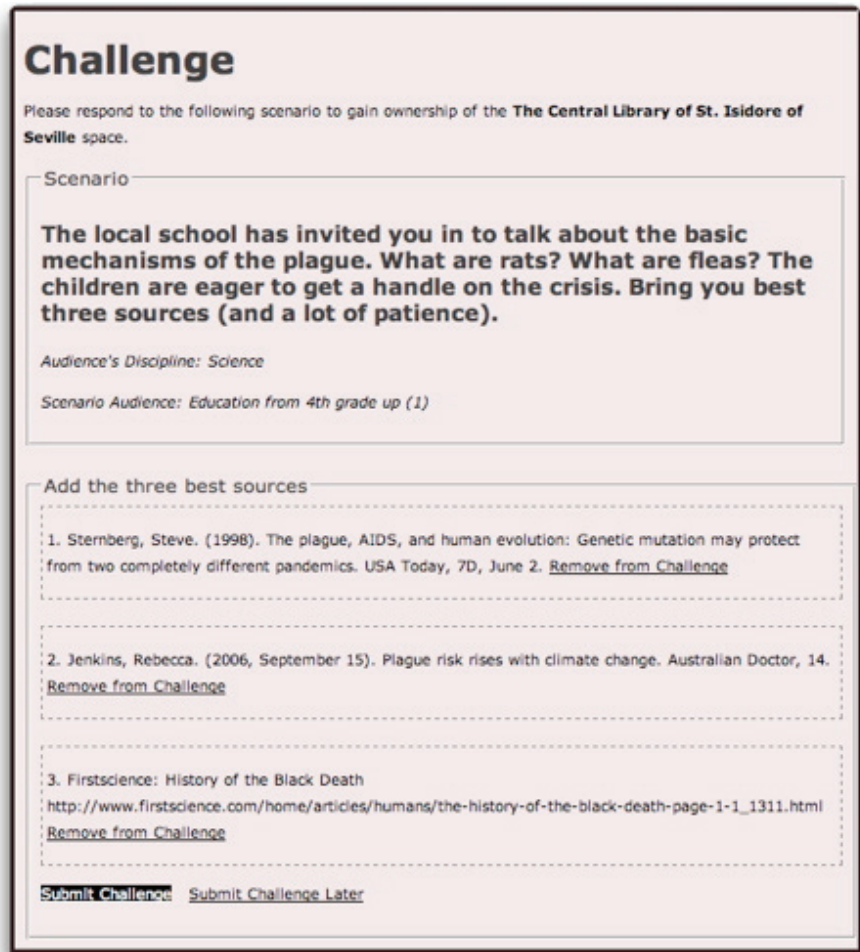


Figure 3.35. The game’s feedback to the yellow team regarding the judging of bibliography sources (top)

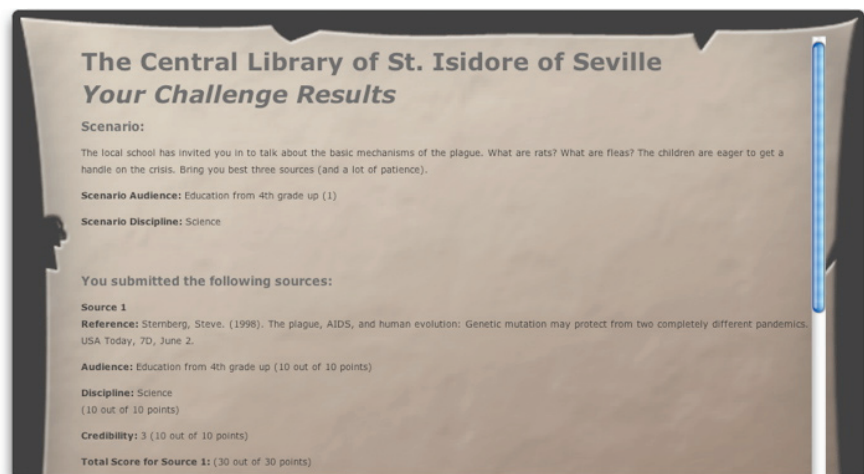


Figure 3.36. The game’s feedback to the yellow team regarding the judging of bibliography sources (bottom)

The game gives perfect scores to 2 of the 3 bibliography sources because they match the desired discipline (i.e., “Science”), audience level (“4th grade and up”), and come from credible sources (i.e., a well-respected newspaper, a scientific journal, and the web site of a popular science magazine). The game deducts 2 points for the team’s third bibliography entry because the audience level of this source is slightly higher (“9th grade and up”) than that called for by the scenario. Overall, the yellow team scores 88 of a possible 90 points. This high score should put them in contention for wresting control of the Central Library of St. Isidore of Seville from the red team.

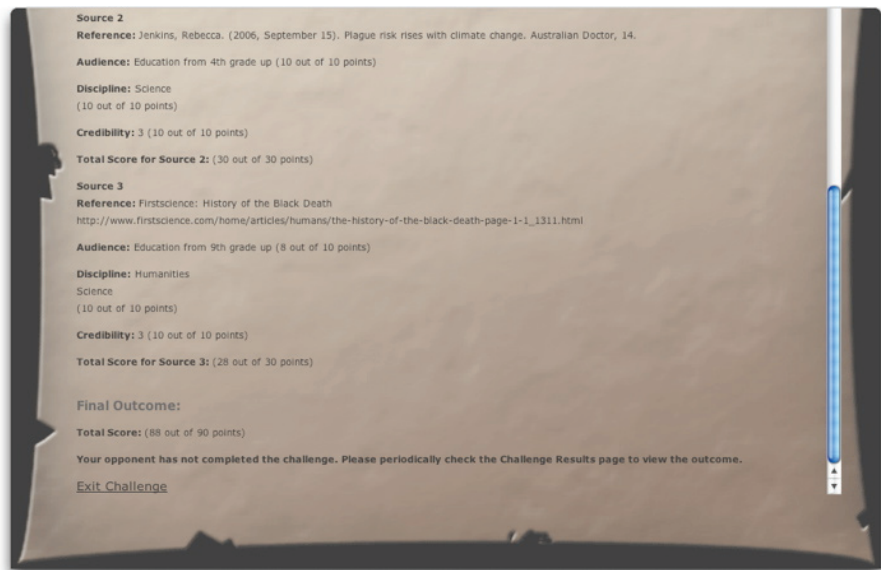


Figure 3.37. Red team’s Backpack bearing challenge notification

The red team learns about the yellow team’s challenge through a link in its Backpack (figure 3.37). The link is listed under the “Challenge(s)” heading and cites the monastery library for which the yellow team is challenging. Clicking on the link opens the challenge interface. On the left window is displayed the same challenge scenario to which the yellow team responded (see figure 3.31) and on the right window are displayed the red team’s bibliography sources (see figure 3.32 for an example bearing sources in the yellow team’s bibliography). Because the red team has landed on different monastery library spaces and given correct answers to different questions, their bibliography sources are not the same as the yellow team’s sources.

The red team has up to 4 days to respond to the yellow team’s challenge. Like the yellow team, the red team needs to be cautious choosing sources that match the “Science” discipline of the challenge scenario, the “4th grade and up” audience level, and that come from credible sources.



Figure 3.38. Bibliography sources the red team submits to the challenge

Figure 3.38 shows the 3 bibliography sources that the red team submits to the challenge. Two sources reflect the “Science” disciplines and one reflects the “Medical” disciplines. All three come from respected journal-article databases and are rather technical in nature.

Shortly after the red team submits its bibliography sources to the game, the game responds with feedback telling the red team it has lost the challenge and telling how it scored the team’s bibliography sources (figures 3.39 and 3.40).

Reviewing this feedback, the red team learns that it earns 25 of 30 points for the “Discipline” aspect of bibliography sources submitting 2 entries (10 points each) from the “Science” disciplines and 1 entry from the “Medical” disciplines (5 points). It earns 30 of 30 points for the “Credibility” aspect of Bibliography sources submitting 3 entries from highly credible sources.

Challenge

Please respond to the following scenario to gain ownership of the **The Central Library of St. Isidore of Seville** space.

Scenario

The local school has invited you in to talk about the basic mechanisms of the plague. What are rats? What are fleas? The children are eager to get a handle on the crisis. Bring you best three sources (and a lot of patience).

Audience's Discipline: Science

Scenario Audience: Education from 4th grade up (1)

Add the three best sources

1. Zink, A. R., Grabner, W., & Nerlich, A. G. (2005). Molecular identification of human tuberculosis in recent and historic bone tissue samples: The role of molecular techniques for the study of histo... [Remove from Challenge](#)
2. Ristaino, J. B., Groves, C. T., & Parra, G. R. (2001, June 7). PCR amplification of the Irish potato famine pathogen from historic specimens. *Nature*, 411(6838), 695-697. [Remove from Challenge](#)
3. Barnes, I. & Thomas, M. G. (2006, March 22). Evaluating bacterial pathogen DNA preservation in museum osteological collections. *Proceedings. Biological Sciences. The Royal Society*, 273(1587), 645-653. [Remove from Challenge](#)

[Submit Challenge](#) [Submit Challenge Later](#)

Figure 3.39. The game’s feedback to the red team regarding the judging of bibliography sources (top)

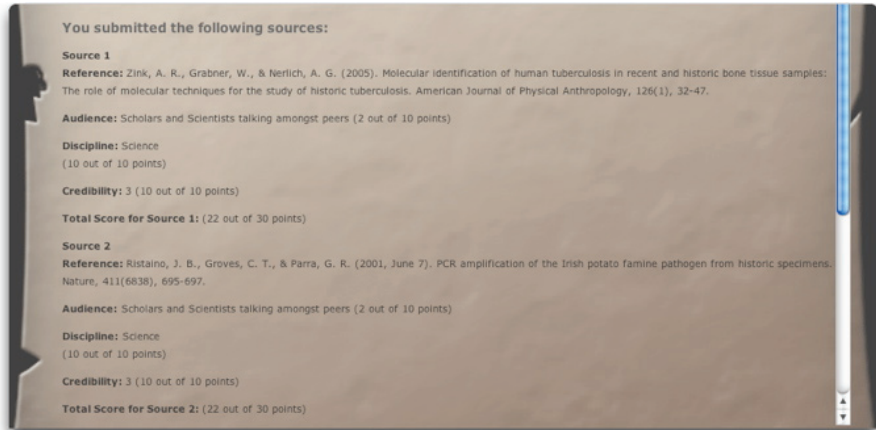


Figure 3.40. The game’s feedback to the red team regarding the judging of bibliography sources (bottom)

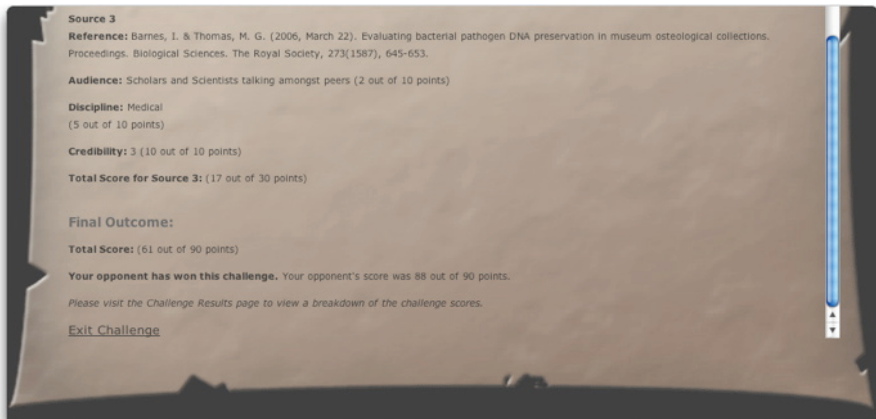
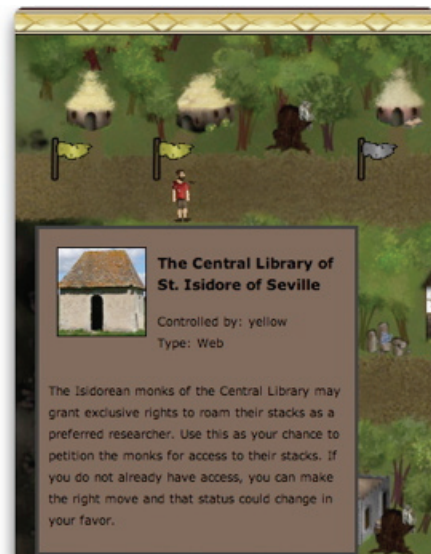


Figure 3.41. Yellow flag indicating the yellow team’s ownership of the Central Library of St. Isidore of Seville

What hurt the team’s chances at winning this challenge was its failure to match the “Audience level” aspect of bibliography sources submitting 3 entries from very technical journal articles that are written for an audience with high levels of knowledge and expertise in the sciences. Because the scenario’s audience is young children (see figure 3.31), they would not necessarily understand the technical nature of what researchers would glean from these sources and be able to share with them. Thus, the game awards the red team only 2 points per bibliography source because of the mismatch with regard to audience level. Overall, the red team scores 61 of a possible 90 points losing the challenge and forfeiting its ownership of the Central Library of St. Isidore of Seville to the yellow team.

The game adds this library to the yellow team’s Backpack and



changes its flag from red to yellow (figure 3.41). Upon the conclusion of the challenge, yellow team views the updated Leaderboard and notes that they have increased their lead over the red and blue teams (figure 3.42). To add to its lead, the yellow team could issue additional challenges to these two teams.

Figure 3.42. Updated leaderboard following the completed challenge



Game Leaderboard							
Back to board							
Color	Team Name	Gold Score	Scroll Score	Territory Score	Time Penalty	Total Score	Game Board
	Karen	225	12600	900	-910	12815	kings
	Xingxing	271	11200	450	-376	11545	kings
	Beth	224	11400	900	-1503	11021	kings

3.5 Section 3 Summary

Section 3 describes the design and development of the *Defense of Hidgeon: The Plague Years*. Storygame design began exactly one year before the Delmas Foundation awarded a grant to the Storygame Project team (section 3.1) when the project team chose the General-to-Specific (GenSpec) Search Strategy Model as the underlying content that game players would learn as a result of game play and brainstormed on game genre. After the Delmas Foundation award, the project team identified the game's electronic board game genre and situated game play in the medieval Duchy of Hidgeon when the Black Death was sweeping the European continent (section 3.2). Game play called on players to help Hidgeon's ruler, Duke Jerome, find information that he could use to keep the Duchy's population from panicking over the dangerous encroachment of the Black Death (section 3.4.1).

Our web-based board game was primarily written in Ruby along with HTML and CSS (Section 3.3).

Section 3.4 covers the design of *Defense of Hidgeon* showing typical game play in section 3.4.7, how teams can monitor their progress especially vis-à-vis their opponents in section 3.4.8, and how the game scores teams in section 3.4.9. The game's chief interactive feature — the challenge — is described and illustrated in sections 3.4.10 to 3.4.11.

4 STORYGAME PLAY

4.1 Signing Up Students for Game Play

The project team recruited Professor Robert L. Frost, Associate Professor in the School of Information (SI), to volunteer students in his class numbered SI 110 and named “Introduction to Information Studies” to play the game. SI 110 is SI’s only undergraduate course and attracts undergraduate students at all levels from a wide range of majors.

The class numbered 75 students: 25 freshmen, 23 sophomores, 9 juniors, and 18 seniors. With regard to introducing SI 110 students to the game, the PI’s inclination was to downplay the game preferring instead to gauge student enthusiasm on the game itself not on a special buildup; consequently, Professor Frost mentioned game play to SI 110 in passing at the beginning of the semester. He did not list it on the course syllabus or any other formal document distributed to students. On Tuesday, October 23, he did, however, prime the students with news that PI Karen Markey would be visiting the class a week later on Tuesday, October 30, to introduce them to game play. Additionally, he announced that in class on Thursday, October 25, a U-M librarian would give students an orientation to the U-M Library’s online library resources especially the Mirlyn online catalog and Search Tools, the U-M Library’s tool for choosing one or more of the over one thousand databases available to the U-M learning community through licenses, institutional memberships, or for free. Although the scheduling of the two events, i.e., librarian’s visit and game play, was not intentional, it was bound to give rise to comparisons between two approaches with regard to learning about finding information and conducting library research.

On October 30, Frost introduced Markey to SI 110 students. Her remarks about the game were brief because she did not want to predispose students to thinking about the game in a particular way, instead, she wanted students to develop their own ideas about what the game was teaching them. Her introduction to the game covered these areas:

- Game development including support from the Delmas Foundation
- Game objectives
- A demonstration of game play
- Encouragement to think about what the game teaches them while they play it
- A loose deadline of Wednesday, November 21, the day before Thanksgiving, for the final day of game play
- A notice that Storygame Project team members would visit their discussion groups after game play ended in November to ask them questions that would help the team evaluate the game especially their experiences playing the game, what they learned, and how they would improve the game
- A summary of monetary prizes to first, second, and third place winners
- A request to sign up on teams to start playing the game later that same week
- Thanks for participating in the project team’s evaluation of the game

Markey passed around signup sheets that identified URLs for signing onto the game and for watching a YouTube movie about playing the game (see Appendix O). The signup sheet also advised students to use the Firefox browser, told them where U-M librarians could find release codes for the Hospital, and gave

students contact information for Storygame Project team members in case players experienced technical problems. She asked students to form teams of three or four fellow classmates, fill in the bottom half of the signup sheet with their names and email addresses, and return their completed sheets to their instructor two days later.

4.2 Incentives for Game Play

On November 1, Frost collected signup sheets and passed them to the Storygame Project team for processing. Of the 75 students enrolled in SI 110, 29 students signed up on 8 teams that ranged from 2 to 4 students. The project team assigned teams to one of two game boards named “Hidgeon” and “Plague,” assigned teams a game piece, generated a user name and password for each team, and sent teams this information via email messages on November 2. Appendix P is an example of this email correspondence. Game play began on Friday, November 3.

Project team members scrutinized daily logs of game play activity. Only one team played the game over the first weekend answering 12 of 14 questions correctly and acquiring 8 of the “Hidgeon” game board’s 17 exclusive licenses to monastery libraries.

Concerned about the low level of game play, Markey met with Frost to discuss strategies to urge more students to sign up for teams and to urge them to play. Frost volunteered to give a half-letter grade increase to students who answered 40% or more questions correctly in the course of collecting all 18 monastery library scrolls. He and his teaching assistant announced this incentive during mandatory discussion groups on the following Tuesday and Wednesday, November 6 and 7. In response, an additional 20 students signed up on 5 new teams to play the game. Overall, 49 (65%) of the 75 students in the class signed up on 13 teams to play the game. By the following Monday morning (November 12), 6 of the game’s 13 teams had signed onto the game and attempted an answer to at least one question.

4.3 Ending the Game

When introducing SI 110 students to the game on Tuesday, October 30, the PI was tentative about ending game play on Wednesday, November 21, the day before Thanksgiving break. She left the door open on purpose for extending the game in case technical problems or other unforeseen factors adversely affected game play. As Thanksgiving break approached, students asked the Storygame Project team to extend the game so they could play it over the Thanksgiving break. The technical problems that suspended game play during the Thanksgiving break were fixed when staff returned to work the following Monday. The project team added another three days to game play and ended the game at 11:59 pm on Thursday, November 29.

4.4 Section 4 Summary

Professor Robert L. Frost volunteered undergraduate students in his SI 110 class named “Introduction to Information Studies” to play the *Defense of Hidgeon* (section 4.1). Except for a comment in passing at the beginning of the semester, Frost did not announce the game in a prominent way to students. PI Markey attended class on Tuesday, October 30, to introduce SI 110 students to game play.

Initially, 29 students signed up on 8 teams to play the game (section 4.2). To spark students’ interest in game play, Frost gave this incentive to his students: earn all 18 scrolls with a 40% accuracy rate and receive a half-letter grade increase on midterm or final exam. In response, 20 more students signed up. Overall, 49 (65%) of the 75 students in the class signed up on 13 teams to play the game.

The end of the game was originally scheduled for Wednesday, November 21, the day before Thanksgiving break (section 4.3). Students asked the Storygame Project team to extend the game so they could play

it over the Thanksgiving break. Due to technical problems that suspended game play during this break, the project team added another four days to game play and ended the game at 11:59 pm on Thursday, November 29.

5 COLLECTING GAME PLAY DATA

5.1 Game-Play Transaction Logging

While SI 110 students played the game, project staff captured data about their game play in two different ways. The first method involved a Perl script that was set to run automatically three times a day (4 AM, 12 PM, and 8 PM). This script captured data similar to each team's report card data (i.e., questions attempted and questions answered correctly by type, scrolls by type, and time elapsed since the start of the game), dashboard (i.e., current space, gold, and scrolls by type), and backpack (i.e., library licenses owned by type and challenges). It also captured score-related data similar to Leaderboard data. Each time the Perl script ran, it deposited captured data into consecutive columns of a Microsoft Excel workbook that had been prepared in advance for each team. Additionally, a master Excel file was created which, when opened, was automatically updated using the data from all of these individual workbooks. The master file included a worksheet for each team, as well as worksheets that automatically calculated averages for each game board and across all teams together. One last worksheet in the master file showed just the most recently captured statistics for all teams, including game board averages and averages across all teams. After the game had ended, the master Excel workbook was used to perform analysis of game data.

The second method involved a database internal to the actual game program. Every time that the game administered a question to a team, the following information was recorded:

1. A transaction identification number
2. Name of the team and its assigned identification number
3. Question type (e.g., web, encyclopedia, book, etc.);
4. Name and identification number of the game space the team landed on
5. Text of the question (including the three possible answers for the team to select from) and its assigned identification number
6. Correct answers for the question
7. Explanation given for the correct answers
8. Whether the team answered the question correctly
9. Time when the team answered the question

When the game ended on November 29, summary data from this database were copied into Excel to be used for further analysis.

5.2 Post-game Focused Group Interviews

PIs and doctoral student assistants attended SI 110's three regularly-scheduled weekly Discussion Groups on November 27 and 28, 2007 to conduct focused group interviews with students enrolled in the class. Discussion group attendance is mandatory for students enrolled in SI 110 and instructors take attendance. About 25 of the 75 students enrolled in SI 110 were seated in each discussion group. Students were a mix of players and non-players of the *Defense of Hidgeon*. During the interviews, some students were forthright and outspoken. Others were quiet and shy. Because of the large size of Discussion Groups and limited time period of 50 minutes, the Storygame Project team was unable to get reactions from every student present; however, the discussion was lively and continuous with few, if any, moments of prolonged or uneasy silence.

5.3 Focused Group Interview Questions

Except for brief announcements at the beginning of class, Discussion Group proceedings were devoted to the interview. The project team introduced themselves to students as follows:

My name is Professor Markey and helping me are Professor Rosenberg and my doctoral students Beth St. Jean and Xingxing Yao. I have 6 questions to ask you about playing the game. I have passed around a handout that enumerates these 6 questions.

Some questions ask people who played the game to respond, and other questions ask people who did not play the game to respond. We can't take notes quick enough so I'm going to make an audiotaped recording of your remarks. Because I won't ask you to identify yourself other than telling me whether you played or didn't play the game, we can't and we won't connect you personally to what you say on tape. Can we get started?

The PIs asked 6 questions to guide the discussion. They had on hand probes to elicit details from students, get them to articulate or clarify their thoughts, or pursue interesting ideas that emerged during the course of the discussion. Questions and probes are as follows:

1. For those who played the game, I'd like you tell me how you interacted with your fellow teammates. Did you play as a team of the whole? Individually? In pairs?

Probes:

- For those who played in teams, did you divide tasks amongst yourselves? Who did what?
- What technologies did you use to correspond or connect with one another? Cell phone, IM, email?
- Would you play the same or differently in the future? Why?
- Did your team act like a real team, working together, or were there imbalances amongst you? For example, differences in engagement, enthusiasm, and effort.
- Ideally, should this game be played as a team or alone? Why?
- For those who played on their own, why did you play individually? Did other players on your team play on their own too?

2. For those who played the game, tell me what you learned from playing it.

Probes:

- Did the game introduce you to new types of libraries you'd never used before? What were these libraries? Do you think you will use these libraries on your own in the future?
- What questions were the most difficult to answer? Why? What questions were the easiest to answer? Why?
- What observations did you make about the order in which the different types of libraries occurred on the board?
- Did you challenge an opposing team? Why do you think you lost or won your challenges?
- What do you think the game was trying to teach you?

3. If you signed up to play the game but you didn't play it, tell me why you didn't play the game.

Probes:

- Under what circumstances would you play this or a comparable game?
 - Hearing about the game from your fellow classmates, do you regret not playing the game? Why or why not?
4. If you did not sign up to play the game, tell me why you didn't sign up.

Probes:

- Under what circumstances would you play this or a comparable game?
 - Hearing about the game from your fellow classmates, do you regret not playing the game? Why or why not?
5. Tell me how you would improve the game.

Probes:

- What did you like most about the game?
 - What did you like the least?
 - How would you improve the game?
 - Our game's genre was an online board game. What game genre would be more appropriate for learning about doing library research?
 - Describe a game that would give people practice doing research, using the right tools at the right time, choosing the best tools, making decisions about using what they retrieve, and so on?
 - Our game used the "Black Death." Are there other themes more appealing to you? What are these themes?
6. Whether you played the game or not, I'd like to explore using games to learn about doing library research.

Probes:

- What do you think might be the most effective way to learn and practice doing library research? Game, lecture like the librarian gave, other?
- What incentives would make you play this and comparable games? Prizes, course credit, extra credit, more competition, more interaction?

At the end of the 50-minute discussion group, the project team thanked students for playing the game and for their participation in the discussion.

Discussion group proceedings were audiotaped and transcribed. The project team studied audio recordings and transcriptions and categorized students' remarks. Most themes that emerged from discussion group interviews can be traced directly back to the 6 questions and related probes that interviewers posed to students; however, a few themes were unique to a particular discussion group.

5.4 Section 5 Summary

Section 5 tells the Storygame Project team's efforts to collect game play data. Three times a day a Perl script captured each team's play-by-play data to a Microsoft Excel workbook (section 5.1). During game play, the game was programmed to add data to a database about its administration of questions and answers to teams; after the game ended, the project team copied these data into Excel for analysis (section 5.1). Storygame Project team members attended 3 regularly-scheduled SI 110 Discussion Groups where they asked students who played the game questions about their experiences, asked other students why they did not play the game, and asked all students to suggest improvements to information-literacy games generally (sections 5.2 and 5.3).

6 RESULTS OF STORYGAME PLAY

The results of the Storygame Project's analysis of game play data is featured in section 6. Results address these seven topics: (1) game-play winners (section 6.1), (2) game-play patterns (section 6.2), (3) play-by-play description and analysis (section 6.3), (4) an in-depth analysis of the game play of unsuccessful teams including their correct and incorrect answers to questions (section 6.4), (5) an in-depth analysis of the game play of successful teams including their correct answers to questions and questions that were difficult for them to answer (section 6.5), (6) game features and functionality (section 6.6), and (7) what game players learned about library research as a result of playing the game (section 6.7). The section concludes with a summary of game play findings.

6.1 Game-Play Winners

Table 6.1 shows the final scores and ranks for the 13 teams that signed up to play the *Defense of Hidgeon*. The table includes the number of questions teams answered during game play and the estimated number of roundtrips their game pieces made around the game board. The latter is an estimate because the game log did not record every game space on which teams landed. Roundtrip counts are probably underestimated because the number of spaces that generate a question for a team declines as the team's number of times around the board grows. In Table 6.1, teams marked with an asterisk met the instructor's criteria for the incentive.

Table 6.1. Game Results

Team Name	No. Questions	No. Roundtrips [†]	Final Score	Rank
infoHunters*	97	15	14,680	1
heroes*	101	15	14,409	2
victors*	84	13	10,703	3
maize*	43	7	10,432	4
authorities*	42	6	9,519	5
valiant*	62	9	9,368	6
warriors	28	4	1,721	7
redNinjas	1	0	276	8
wolverines	12	2	-2,850	9
conquerors	12	2	-5,239	10
blue	3	0	-6,640	13
best	0	0	-6,640	13
hail	0	0	-6,640	13

* The asterisk designates teams meeting the instructor's criteria for the incentive.

[†] The game board consists of 34 spaces, 23 of which generate a question for each team that lands on them. A roundtrip estimate is calculated by dividing the total number of questions the team attempted by the product of the proportion of question-generating spaces ($23/34$) and the estimated number of spaces that a team would land on during one lap around the board ($34/3.5$, where 3.5 is the average dice roll since the die is a simulation of a traditional 6-sided die). This formula generates a lower-bound estimate for the number of times that a team has gone around the board since the proportion of question-generating spaces will continuously decrease as teams earn scrolls. Thus, a team that has answered 42 questions has gone around the board a minimum of 6 times ($42 / (23/34 * 34/3.5)$).

The InfoHunters team won the game with 14,680 points, making an estimated 15 roundtrips to answer 97 questions. Teams Heroes and Victors placed second and third, respectively. The project team gave \$100 to each of the 4 students on the InfoHunters team, \$67 to each of the 3 Heroes, and \$25 to each of the 4 Victors. All InfoHunters and Heroes collected their prize money before holiday break began on December 21. The Victors procrastinated, collecting their prize money right after this break in January or before spring break in February 2008. Professor Robert Frost increased midterm or final grades one-half letter grade for the students on the first 6-listed teams in Table 6.1.

6.2 Game-Play Patterns

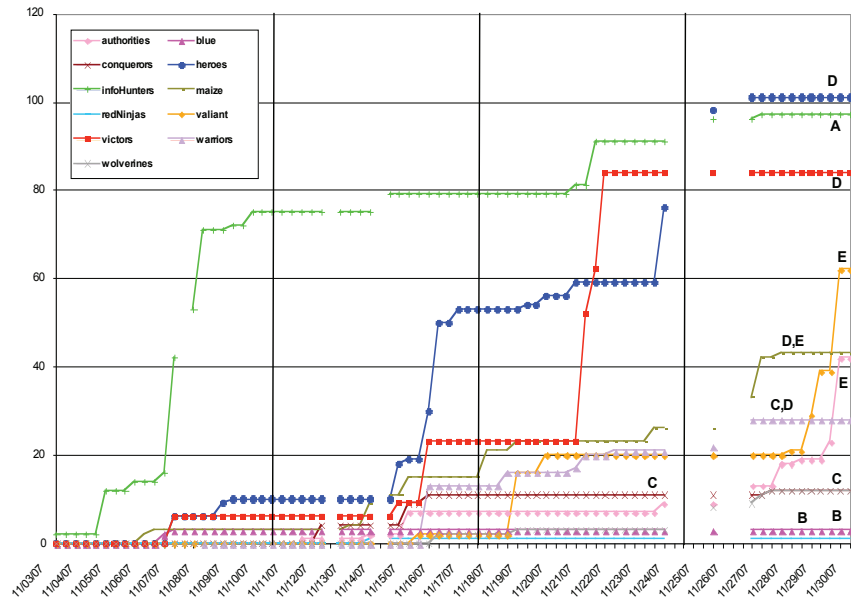
Figure 6.1 shows game-play patterns based on the cumulative number of questions that teams answered. An examination of game play activity reveals these game-play patterns:

- A. Instant starters: A team that begins game play immediately after the game's start and, in the absence of competition from opposing teams, collects 18 scrolls and all monastery library licenses within a week of the game's start. Example: InfoHunters.

- B. Dropouts: Teams that sign up for game play but drop out, some failing to earn any scrolls, and others earning one or two scrolls. Examples: Hail, Best, and Blue.
- C. Testing the waters: Teams with low levels of game play activity that eventually become dropouts (#B above), play in spurts (#D below), or at the last minute (#E below). Examples: Conquerors, Wolverines, and Warriors.
- D. Pre-Thanksgiving dashers: A handful of teams that play the game in spurts before Thanksgiving break. Some of these teams drop out entirely, and others continue game play achieving game-play objectives connected with the incentive. Examples: Warriors and Victors.
- E. Last-minute rushers: Several teams that rush to complete game play before the game ended on November so they could achieve game-play objectives connected with the incentive. Examples: Authorities and Valiant.

Figure 6.1. Game-play patterns based on cumulative number of questions answered

In figure 6.1, the letters A to E on the far right side that accompany the colored lines for each of the 13 teams refer to the 5 game-play patterns above.



6.3 Play-by-Play Description and Analysis

When the game begins on November 3, the InfoHunters play immediately earning 2 web scrolls and purchasing 2 exclusive licenses. Over the next two days, they add to their lead, earning another 8 scrolls (1 more web, 3 encyclopedia, 3 books, and 1 database scrolls) and purchasing 6 exclusive licenses to monastery libraries. The InfoHunters play on the “Hidgeon” game board.

Team Maize begins game play on the “Hidgeon” game board on November 6, collecting 2 web scrolls at the St. Isidore Libraries owned by InfoHunters. On November 7, the InfoHunters earn 7 more scrolls. InfoHunters need to earn only 1 citation-database scroll at a St. Dominic de Guzman library to earn all 18. InfoHunters now own exclusive licenses to 15 of 17 monastery libraries. On November 7, the Victors team plays the game on the “Hidgeon” game board for the first time earning 1 encyclopedia scroll.

On November 9, the InfoHunters earn their 18th scroll. InfoHunters also own exclusive licenses to all but 1 monastery library on the “Hidgeon” game board. They are hardly bothered by the Maize and Victors teams playing on this same game board.

On November 7, the Heroes team begins game play on the “Plague” game board earning 3 scrolls (i.e., 1 scroll each for encyclopedias, databases, and citation databases) and purchasing exclusive licenses to all 3.

On November 10, the Maize team issues the game’s first challenge. Having only 6 entries in its bibliography, Maize loses the challenge to the InfoHunters who have a complete bibliography of 54 entries from which to choose. Two days later, the Victors team challenges the InfoHunters team. Again, the InfoHunters win because the Victors have only 3 entries in their bibliography for their 1 earned scroll. On the “Plague” game board, the Conquerors team earns its first scroll.

The Maize team asserts itself on the “Hidgeon” game board from November 13 to 18, earning 1 to 2 scrolls almost every day. In a burst of activity, the Victors earn 8 scrolls on November 14 and 15. The Authorities team initiates game play on November 15 with 2 books scrolls; four days later, they challenge the InfoHunters and lose, most likely because they have only 6 entries in their bibliography compared to the InfoHunters who have 54 bibliography entries from which to choose. The Victors spurt again on November 21, earning 9 scrolls to complete the 18-scroll quota. Failing to win its 3 challenges with the InfoHunters, the Victors team retires.

On the “Plague” game board, the Heroes continue their march toward a full slate of scrolls earning 3 scrolls on November 14, 5 on November 15, and 6 on November 16. The Heroes are not consistent about purchasing exclusive licenses, owning 13 of the 17 monastery libraries at which they have earned scrolls. On this same game board, the Heroes now have company from the Warriors team who earn 4 scrolls on November 15 and 2 scrolls on November 18. One day later, the Warriors challenge the Heroes 3 times. Having 3 times more bibliography entries as the Warriors, the Heroes easily win all 3 challenges. The Warriors add 3 scrolls before Thanksgiving break on November 21. The Valiant team enters the game on the “Plague” game board earning 6 scrolls at various web, encyclopedia, edited works, and citation database libraries on November 18 and 19.

Over Thanksgiving break, game play is halted by technical problems that occur when teams unexpectedly exhaust the game’s supply of unique Library Study and Sage Advice questions. After project programmers pinpoint and fix the problem, game play resumes on November 26, and five teams assert themselves with game play. On the “Hidgeon” game board, teams Authorities and Maize earn 3 and 4 scrolls, respectively. The Maize team now has 36 entries in its bibliography, but it does not need them to challenge the leading InfoHunters team for its exclusive license to the Eastern Library of St. Isidore of Seville because the InfoHunters fail to respond to the challenge within the 96-hour deadline. This St. Isidore Library is the only one that falls into the hands of a team on the “Hidgeon” game board other than the InfoHunters.

On the “Plague” game board, the Wolverines team engages in scroll-earning game play for the first and only time on November 26 and earns 2 scrolls. After losing 1 of their 17 monastery libraries to a challenge by the Warriors, the Heroes retire. When teams retire, the game exchanges the retiring team’s exclusive licenses for an equal value in gold and puts the licenses back up for sale. The Valiant team is now the only active team on the “Plague” board. Despite the availability of all monastery library licenses due to the Heroes’ retirement, Valiant is in a last-minute rush to earn scrolls so that it can meet the instructor’s incentive before the game ends on November 29. On November 28 and 29, Valiant earns 2 and 10 scrolls, respectively, to add to its base of 6 scrolls. Valiant appears to be satisfied meeting the instructor’s incentive, failing to purchase licenses or engage in game play that would improve its standing in the game with regard to monetary prizes.

On the “Hidgeon” game board, the Authorities are also in a last-minute rush to meet the instructor’s incentive. On November 27, 28, and 29, the Authorities earn 2, 1, and 10 scrolls respectively, to add to its base of 5 scrolls. Like the Valiant team, the Authorities appear to be only interested in meeting the instructor’s incentive. Maize earns 6 scrolls on November 27, achieving the 18-scroll quota for the instructor’s incentive.

When game play ends on November 29 at 11:59 PM, 4 teams on the “Hidgeon” and 2 teams on the “Plague” board have met the instructor’s incentive of collecting 18 scrolls with a 40% or greater accuracy rate on answers to questions. Teams Valiant, Authorities, and Maize exhibit game-play behavior that is connected to only meeting the instructor’s incentive. Clearly, InfoHunters have played the game to win, initiating game play on the same day that the game begins, earning all scrolls and owning all exclusive licenses at the same time their major competitors — teams Heroes, Victors, and Maize — are testing the waters. Although second and third places are up for grabs, the Heroes team is easily able to assert itself because it plays on the low-key “Plague” game board where the Warriors are an irritating but ineffective opponent and team Valiant is only intent on meeting the instructor’s incentive.

Table 6.2. Daily Changes for the Top 4 Finishers on the Leaderboard

Date(s)	InfoHunters		Heroes		Victors		Maize	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
11/03–11/05	730	1	-350	6	-350	6	-350	6
11/06	5,269	1	-1,080	7	-1,080	7	221	2
11/07	13,408	1	2,919	2	-738	8	141	3
11/08	14,751	1	2,548	2	-948	5	61	3
11/09–11/10	15,213	1	2,384	2	-1,158	5	-19	4
11/11	15,332	1	2,144	2	-1,639	4	-1,031	3
11/12	15,332	1	2,024	2	-1,855	5	-1,191	4
11/13–11/14	15,395	1	1,904	2	-2,071	6	-872	5
11/15–11/16	15,120	1	6,660	2	2,770	3	-137	6
11/17	15,146	1	13,210	2	2,426	3	2,157	4
11/18–11/20	15,154	1	13,176	2	2,255	4	3,272	3
11/21–11/24	14,832	1	13,269	2	10,703	3	2,892	4
11/25	14,518	2	14,586	1	10,703	3	3,554	4
11/26–11/29	14,573	1	14,409	2	10,703	3	5,415	4

Table 6.2 shows Leaderboard standings for the top 4 finishers on the game’s Leaderboard. If the 4 teams’ ranks on the Leaderboard did not change from one day to the next, figure 6.2 gives a date range but does not update daily scores. InfoHunters are in first place every day of the game except on November 25 when Heroes overtakes them. Losing a challenge on the next day, the Heroes retire and avoid future challenges. The InfoHunters answer a few Library Study and Sage Advice questions to regain the lead for good. Both Victors and Maize are last-minute rushers, playing the game during its last week, content to finish in 3rd and 4th place, respectively, and meet the instructor’s incentive.

6.4 The Game Play of Unsuccessful Teams

This report uses the terminology “unsuccessful teams” to refer to teams that failed to meet the criteria for the instructor’s grade increase, that is, earning 18 scrolls with 40% accuracy rate answering questions. Figure 6.2 shows the daily game activity of 7 unsuccessful teams. Activity is represented as the number of questions these teams answered per day. The Best and Hail teams are dropouts, never signing onto the game. The RedNinjas and Blue teams sign onto the game once or twice, they answer 1 and 3 questions, respectively, and they never sign on again. The Conquerors and Wolverines teams are somewhat more active, signing onto the game 3 and 5 times, respectively, and answering as many as 7 questions in one sitting. The Warriors team plays in spurts with most of their activity occurring from the middle to end of November. The Warriors’ accuracy rate exceeds the instructor’s 40% minimum. Unfortunately, this team is unable to sustain game play for the length of time needed to earn 18 scrolls.

Figure 6.2. Game-play patterns of unsuccessful teams based on number of questions answered

Table 6.3 shows the number of questions that unsuccessful teams answered, and percentages of correct answers by library resource type including Library Study and Sage Advice questions. (Table 6.3 does not include results for the 2 unsuccessful teams that failed to sign onto the game because signing onto the game was the only way to answer questions.) Estimated probabilities of guessing right answers to questions range from 0.29 (for encyclopedias, edited works, databases, and citation databases) to 0.30 (for the web, books, Library Study, and Sage Advice). (Estimates take into account questions that have two or three correct answers).

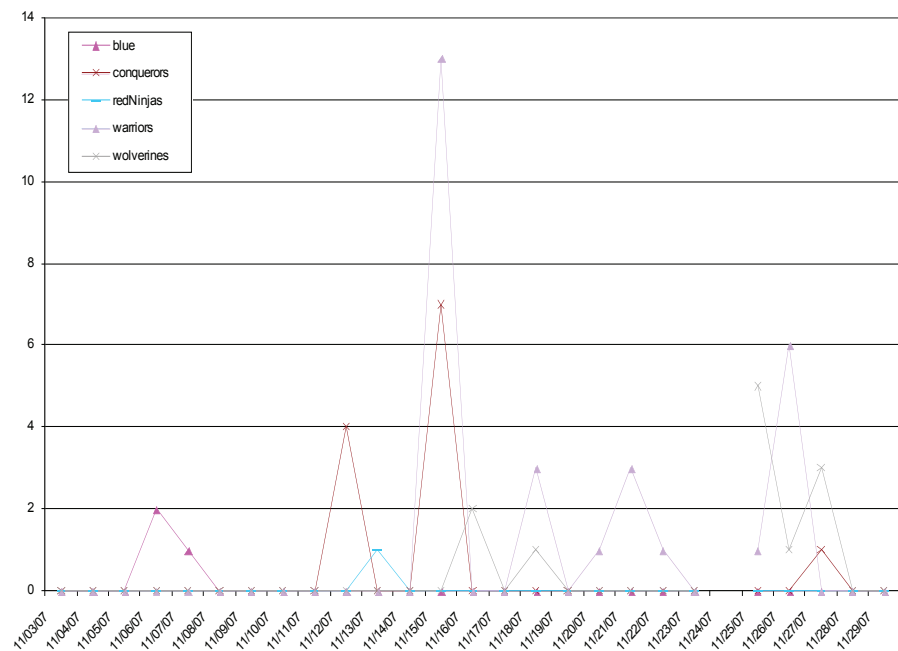


Table 6.3. Correct Answers to All Questions Given by Unsuccessful Teams

Team	No. Questions	No. Correct	% Correct								
			Web [†]	Ency	Bk	EW	Db	CDb	LS	SA	% Total
Warriors	28	14	100	75	0	0	100	0	100	43	50.0
Conquerors	12	2	0	0	33	0	0	n/a	0	50	16.7
Wolverines	12	3	0	0	0	50	100	0	n/a	50	25.0
Blue	3	0	n/a	0	0	n/a	n/a	n/a	0	n/a	0.0
RedNinjas	1	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	100.0
#Total	56	20	–	–	–	–	–	–	–	–	–
Average %	–	–	43	38	17	13	67	0	50	50	35.7

[†] Key: Web = Web questions, Ency = Encyclopedia questions, Bk = Book questions, EW = Edited Works questions, Db = journal-article Database questions, CDb = Citation Database questions, LS = Library Study questions, SA = Sage Advice questions, n/a = not applicable (the team fails to land on a game space requiring this question type).

Overall, unsuccessful teams answer 35.7% of questions correctly. Except for the Warriors, unsuccessful teams appear to be testing the waters, that is, trying to determine whether they should invest time and effort in game playing. Three teams register low percentages of correct answers that are less than what would be expected by choosing answers at random, and one team answers the one and only question it ever answers correctly. Game play by the Warriors team is different. This team answers 50% of 28 questions correctly, achieving high percentages (i.e., 75% or 100%) for types of libraries that usually entail online searches (i.e., web, encyclopedias, journal-article databases, and Library Study) and low percentages (i.e., 0%) for answers to questions that usually entail a trip to the library (i.e., books and edited works). Omit the Warriors team from Table 6.3 and the percentage of correct answers dips to 21%, about 8 percentage points below what would be expected by chance. Most likely, the Warriors had every intention of meeting the instructor's incentive but a combination of competing priorities and technical problems that suspended game play during Thanksgiving break prevented them from doing so.

The Warriors are the only unsuccessful team to issue a challenge. They challenge the Heroes 4 times and win 1 time. Playing on the "Plague" game board, the Warriors purchase an exclusive license to only 2 monastery libraries.

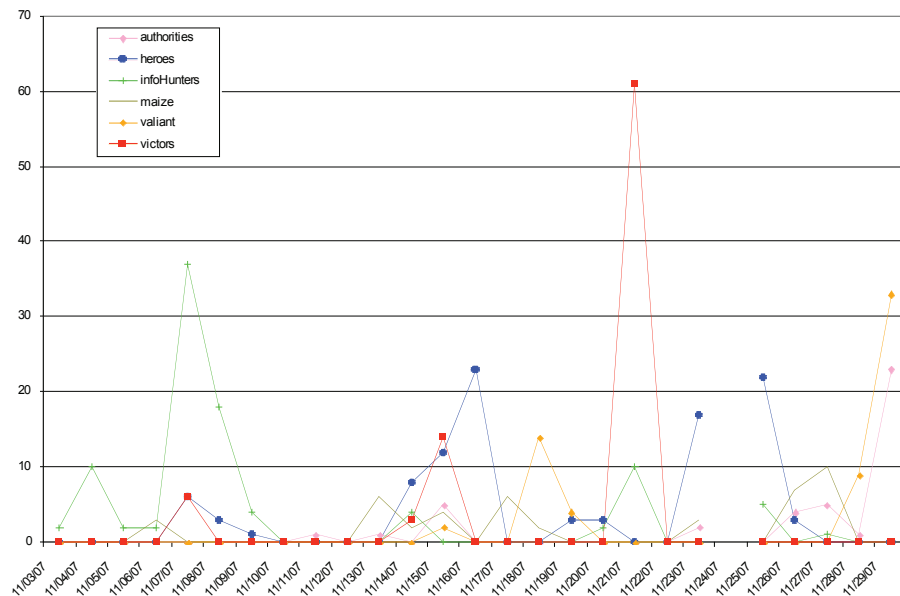
6.5 The Game Play of Successful Teams

6.5.1 Game-Play Patterns

The term “successful teams” refers to teams that met the criteria for the instructor’s grade increase. Figure 6.3 shows the daily game activity of the game’s 6 successful teams. Activity is represented as the number of questions these teams answered per day.

Figure 6.3. Game-play patterns of successful teams based on number of questions answered

The figure shows team InfoHunters playing on the first day of game play, November 3. In fact, the InfoHunters are the lone game player through much of the first half of November. For the rest of the month, the InfoHunters play sporadically to maintain their leader status and respond to challenges. The Heroes, Victors, and Maize teams appear to “test the waters” answering a few questions shortly after the instructor announces the incentive in class on November 6 and 7. The Victors sign onto the game 3 more times with the lion’s share of their activity occurring on November 21 when they answer over 60 questions. The Maize team signs onto the game 8 more times. Although this team never answers more than 10 questions per signon, its low-level activity is sufficient for them to meet the instructor’s incentive.



Playing on the “Plague” game board, the Heroes become active in mid-November answering questions on a half dozen different days. Heroes answer over 20 questions in the course of earning their final scroll during the game’s final week. The Authorities and Valiant teams earn a handful of scrolls from time to time then rush to meet the criteria for the instructor’s incentive during the game’s final week.

6.5.2 Correct Answers to Monastery Library Questions

The game’s monastery library questions focused on six types of resources: (1) web, (2) encyclopedias, (3) books, (4) edited works, (5) journal-article databases, and (6) citation databases. Estimated probabilities of guessing right answers to questions range from 0.29 (for encyclopedias, edited works, databases, and citation databases) to 0.30 (for the web, books, Library Study, and Sage Advice). (Estimates take into account questions that have two or three correct answers). Teams could conduct much of the research *online* to answer web, encyclopedias, journal-article databases, and citation databases questions. They had to physically travel to the Undergraduate Library’s Reserve Desk to conduct much of the research to answer questions pertaining to books and edited works.

Table 6.4 shows the number of questions that successful teams answered, and percentages of correct answers by library resource type including Library Study and Sage Advice questions.

Table 6.4. Correct Answers to Monastery Questions Given by Successful Teams

Team	No. Questions	No. Correct ^Δ	% Correct						
			Web [†]	Ency	Bk	EW	Db	CDb	%Total
InfoHunters	44	22	58	75	75	33	75	27	50.0
Heroes	35	21	86	75	33	43	75	75	60.0
Victors	44	18	100	50	33	38	75	21	40.9
Maize	32	19	80	100	50	30	75	75	59.4
Authorities	32	18	60	75	75	50	50	43	56.3
Valiant	41	18	43	38	30	50	43	100	43.9
#Total	228	116	–	–	–	–	–	–	–
Average %	–	–	67	62	43	39	62	42	50.9

[†] Key: Web = Web questions, Ency = Encyclopedia questions, Bk = Book questions, EW = Edited Works questions, Db = (journal-article) Database questions, CDb = Citation Database questions.

^Δ Questions sometimes exceed 18 (the quota for number of scrolls) because teams landed on Oracle or Garrison spaces that required them to surrender a scroll and earn it back by answering another monastery library question.

Of the 228 monastery library questions that the game issues, successful teams answer 50.9% of them correctly. Percentages of correct answers are highest for web, encyclopedias, and database questions at 67%, 62%, and 62%, respectively. These percentages are a little over 2 times what would be expected by chance. Because players do not have to leave their personal computers to do the research to answer these questions, they probably did the online research at their computers to answer them.

When asked to identify the game's easiest questions, students immediately replied "web questions." In fact, students agreed that any question that kept them online at their computers was an easy question.

- "Web questions. All you had to do was copy the term if they say Google and usually it was transparent in the first link and that was it."
- "Going to a web site."
- "Anything that usually had to do with going to a website."

6.5.3 Why Did Game Players Answer Many Book, Edited Work, and Citation Database Questions Incorrectly?

Because correct-answer percentages for books (43%), edited works (39%), and citation databases (42%) were only about 10% to 13% higher than players would fare at guessing answers, we sought explanations for such low percentages. During focus groups, project team members asked students to identify the game's most difficult questions. Without hesitation, students chose questions that required them to go to the U-M Library, that is, books and edited works questions. Here is what students said about books and edited works questions:

- “I was doing other work, and I just didn't feel like going to the library.”
- “It's just having to get up and go somewhere it's like ... I didn't have enough time [to go to the library].”
- “I thought it was disruptive. You kind of like had to go to the library to get a source and it's like oh I'm not going to the library and it kind of puts a lag on it because you just kind of hope somebody on your team does it but it goes on for a couple days and then occasionally somebody will figure it out and then you'll get another one to go the library and it just kind of spreads it out and it takes more time to get it done.”
- “Personally I think getting college kids to travel to the library is difficult. I know the only times that my group went to the library [was] to get the codes like you send an email like, oh, we're in the hospital again like we would get the codes when it was almost convenient for us like when we were studying in the library or something but to go and check out books it's time consuming. I know we're college kids, we've got a lot of time but we're also strapped for time sometimes, so I felt like for us to actually leave and go get the books ... I find it hard to fit into my schedule. It always comes up like 15 minutes to run to the library to get a code or something like that. I just felt like going to the library was really taxing on my schedule.”

Prior to game play, the Storygame Project team put books and edited works at University Reserves in the U-M's Undergraduate Library so that they would be available to game players for consultation during game play. Despite the guaranteed availability of the books and edited works cited in the game's questions, students confessed in focus groups that they did not go to the library to examine these items. The project team received confirmation from library staff at University Reserves who told us of the 51 books and edited works on reserve, one item circulated 2 times and four items circulated 1 time. Due to confidentiality of circulation records, we do not know whether these 6 circulations came from students enrolled in SI 110 or from members of the U-M's learning community generally. During interviews, project staff asked students directly whether they went to the library to answer questions pertaining to books and edited works. Students answered in a chorus of “noes” and shook their heads “no.” A handful confessed that they guessed at the answers. The evidence is overwhelming — game players guessed at most answers to the game's books and edited works questions.

The game's books and edited works questions featured a handful of questions that did not require game players to go to the U-M Library. These questions queried students about books and edited works genres or about the Mirlyn online catalog. Table 6.5 gives examples of these questions and answers for books and edited works. Because game players could have taken Mirlyn for a test drive or recognized the answer(s) amongst listed answers, they could have remained at their personal computers to answer these questions. Correct answers to these questions might have been responsible for raising Table 6.4's correct-answer percentages above by-chance rates.

Table 6.5. Question-and-Answer Examples that Do Not Require Player Visits to Libraries

Type	Question	Answers (X = correct; O = incorrect)
Books	Why do authors insert in their books primary documents such as first-person accounts of living and experiencing daily life during the Black Death?	(X) Because the original copies of primary documents are usually unique and reside in foreign archives that few readers are able to visit; (O) Because authors know it is more efficient to cite eyewitnesses verbatim rather than paraphrase their words; (X) Because book authors such as historians of the Black Death are writing many centuries after the actual event and use the content of primary documents to substantiate their claims, ideas, and interpretations
Books	The U-M Library owns only one book on the Black Death with a publication date of 2006 or 2007. Why are there so few recently published books on this topic?	(O) Because the University Library's budget has been slashed, librarians aren't buying more books on the Black Death because the Library already owns so many already, and it is using its paltry book budget to buy books on other subjects; (O) So much is written about the Black Death that today's authors can't find anything new to say about it; (X) It takes years for authors to write a book, another year for the book publisher to edit, print, bind, market, and distribute it, and a few months for the library to order, receive, process, and shelf the book.
Edited works	The content of an edited work is much more apparent in the titles of individual chapters than in the edited work's title. When you retrieve Mirlyn records for edited works, these records do not always list the titles of the individual chapters. Search Mirlyn (http://mirlyn.lib.umich.edu/) for the edited works below and choose the ones for which Mirlyn lists individual chapters.	(X) Frantzen, Allen J. & Moffat, Douglas (Eds.). (1994). <i>The work of work: Servitude, slavery, and labor in medieval Europe</i> . Glasgow: Cruithne Press. [Call number: GRAD HD 4865 .G7 W671 1994]; (X) French, Roger, et al. (Eds.). (1998). <i>Medicine from the Black Death to the French disease</i> . Aldershot, Eng.: Ashgate. [Call number: UGL R 141 .M461 1998]; (O) <i>The Plague reconsidered: A new look at its origin and effects in 16th and 17th century England</i> . (1977). Matlock, Derbyshire: Local Population Studies in association with the S.S.R.C. Cambridge Group for the History of Population and Social Structure. [Call number: PUB RC 178 .G7 P53 1977]
Edited works	Because Mirlyn does not list individual chapters of edited works, it is helpful to learn more about these books before fetching them from the U-M Library bookshelves. The JSTOR database can help. JSTOR is a full text database of digitized journals in humanities and social sciences disciplines. Because journals feature book reviews, JSTOR includes book reviews including reviews for edited works. Which of these edited works are reviewed in JSTOR? (Hint telling how to search JSTOR is excluded here.)	(X) Ormrod, W. M. & Lindley, P. G. (Eds.). (1996). <i>The Black Death in England</i> . Stamford: Paul Watkins. [Call number: GRAD DA 225 .B53 1996]; (X) Mack, Arien (Ed.). (1991). <i>In Time of Plague: The History and Social Consequences of Lethal Epidemic Disease</i> . New York: New York University Press. [Call number: UGL RA 649 .I51 1991]; (X) Campbell, Bruce M. S. (Ed.). (1991). <i>Before the Black Death: Studies in the "crisis" of the early fourteenth century</i> . Manchester, Eng.: Manchester University Press. [Call number: GRAD HC 254 .B441 1991]

The project team seeded all monastery library question databases with comparable questions. These questions expected players to think critically about the particular genre, such as web pages, books, or journals, or about the search engines they used to access them such as Google, Mirlyn, or JSTOR. Because players did not have to scan an item's text to find the answer to a question about the Black Death, we hypothesized that players would regard these questions as requiring less effort, and, thus, be more likely to conduct the research at their computers and answer them correctly. Figure 6.4 shows the results of our analysis.

Figure 6.4. Accuracy rates for questions based on examining texts for answers

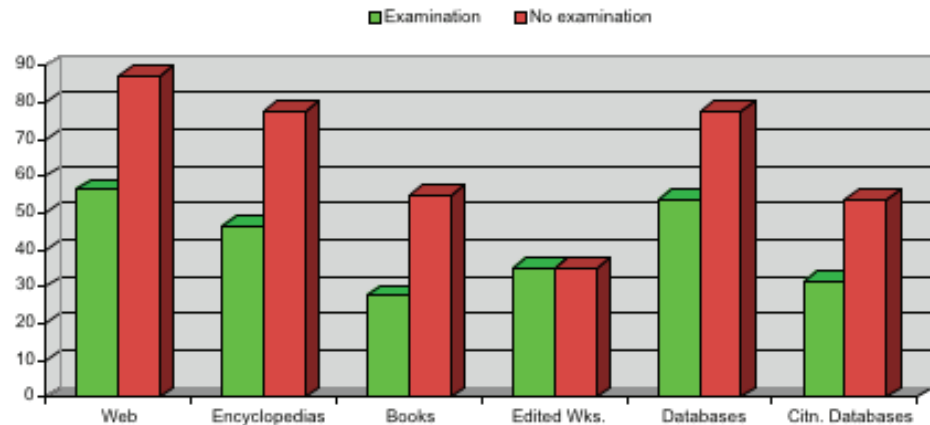
Generally, the results confirmed our suspicions. Except for edited works questions, players were much more likely to give incorrect answers to questions that required them to examine a particular item.

For example, players gave correct answers to 56% of questions when they had to examine a particular web page and correct answers to 88% of questions when they did *not* have to examine a particular web page. The contrast between the two scores was just as great for encyclopedias (47% and 78%), for databases (54% and 78%), and for citation databases (31% and 54%). With regard to books, players were twice as likely to answer questions correctly (28% and 55%) when they did not have to go to the U-M Library to examine an item on reserve. Game players always fared badly with edited works questions, answering a few points better than they would have done by chance.

Game players told us that answering citation database questions was difficult. In fact, only 42% of their answers were correct (see Table 6.4). Despite the convenience of doing the research on their personal computers to answer these questions, game players still did not do well. Why did they fare so badly on citation database questions? One focused group interviewee's explanation cites difficulties with this database's interface:

- “I had more trouble with the citing questions especially because like when you would search the database which was the ISI Web of Science or something, it would come up with a person's name and there would be 19 of the one topic and then there would be 1 under the same topic name and like I would always choose all of the ones that were under the same topic and I would get the answer wrong and I think that would be why. I just felt like maybe the answers were like weird like they were not clear.”

Other reasons could be students' lack of familiarity with citation database searching and the complicated nature of the game's citation database questions. With regard to the former, citation searching may be a new and unique task for undergraduate students. They are accustomed to search engines into which they type words and phrases and expect to scan lists of web sites and journal articles on the same or similar subjects as their words and phrases. Citation searching requires searchers to enter an author name and scan lists of citations that cite the author. The ISI Web of Science often lists titles for the same item on separate



lines due to differences in abbreviations, page numbers, and page ranges, requiring searchers to exert effort scrutinizing intermediary results. In fact, the player's comment above mentions the difficulty of selecting from results-lists in the ISI Web of Science. The bottom line is that despite the *online* nature of citation databases, they are tools that deviate from traditional database searching and require searchers to exert patience, attention, and effort to learn and use them effectively.

The complicated nature of the game's citation-database questions could have had an adverse effect on game players. These questions are lengthy due to the complexity of citation-database search tasks, and due to the inclusion of hints and possible answers. Table 6.6 lists a typical citation-database question alongside typical web and encyclopedia questions. Note the length and complexity of the citation-database question compared to the web and encyclopedia questions. In fact, Table 6.6 displays 5 web and encyclopedia questions in the same amount of space as the 1 citation-database question.

Table 6.6. Typical Web, Encyclopedia, and Citation-Database Questions

Typical web and encyclopedia questions	Typical citation-database question
Select web page(s) from the list below that best answer this question: How did the Black Death of the middle 14th century change the lives of the everyday people who survived the epidemic?	Lead author of a 1998 article, Michel Drancourt is a member of a research team that has successfully detected the plague bacillus in ancient DNA (aDNA). Use cited references to his article to find trends pertaining to the practice of testing ancient DNA (aDNA). (Hint: Use the Web of Science's Cited Reference search as follows.) Start at Search Tools (http://searchtools.lib.umich.edu), click on "Find Databases," and type "isi?" into the box. Choose "ISI Web of Science." Click on its "Cited Ref Search" button. Into the "Cited Author" box type: drancourt m Into the "Cited Year(s)" box type: 1998 Click on the "Search" button. Check listed entries referring to Drancourt's 1998 article in the Proceedings of the National Academy of Sciences and click the "Finish Search" button. Scan the abstracts of retrieved entries to learn about ongoing trends pertaining to the practice of testing aDNA.)
Select web page(s) from the list below that best answer this question: Public health officials in Italy were among the first to establish a quarantine. How long did a quarantine last?	
Select encyclopedia(s) from the list below that best answer this question: In addition to the Jews, what members of the civilian population were blamed for the Black Death?	
Select encyclopedia(s) from the list below that best answer this question: When the bubonic plague hit Hong Kong at the end of the 19th century, what two scientists worked simultaneously but separately to identify its cause?	
Which encyclopedia(s) best describe the role that the Austrian barrier played in the containment of the plague?	

If game players guessed at answers to books and edited works questions instead of going to the U-M Library to examine these items, they might have done the same for these complicated citation-database questions. Their behavior was governed by the principle of least effort (Rosenberg 1966). "This principle states that most researchers (even 'serious' researchers) will tend to choose easily available information sources, even when they are objectively of low quality, and, further, will tend to be satisfied with whatever can be found easily in preference to pursuing higher-quality sources whose use would require a greater

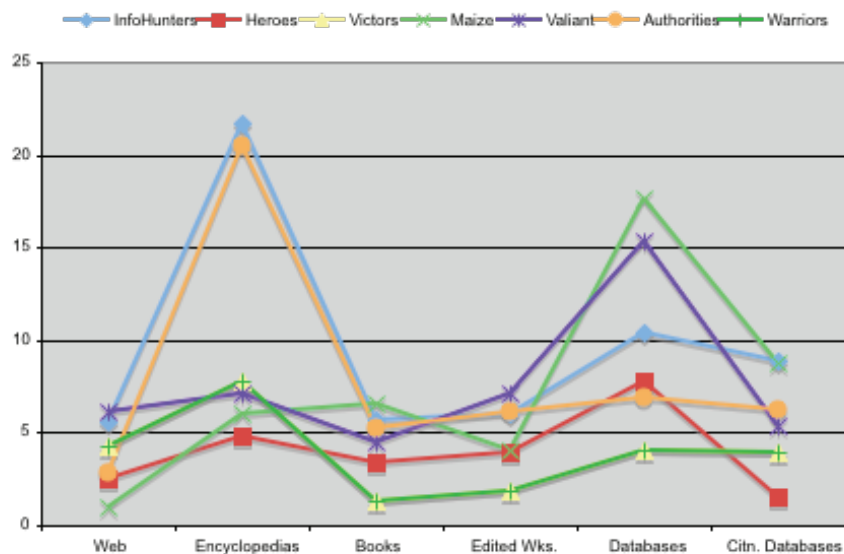
amount of effort” (Mann 1993, 93). Applying this principle to game play, students did the research when it was convenient, easy, and straightforward for them to do so. They avoided the research when it was inconvenient, difficult, or complicated. For the most part, they were not penalized for their actions because they were competitive vis-à-vis the game play of opposing teams and managed to keep the overall percentage of correct answers well above the 40% minimum connected with the instructor’s incentive.

6.5.4 Time Estimates for Answering Monastery Library Questions

From logging data, the project team was able to generate rough estimates of the amount of time teams spent answering questions. Excluded from the analysis were the times for questions on which players started because the logs could track when players signed onto their web browser. Excluded were also the times for questions on which players ended because players did not always explicitly log out of the game. However, when players answered several questions in succession, our analysis of logged data should be accurate. Overall averages for answering questions are 4.2 minutes for the web, 9.7 minutes for encyclopedias, 4.2 minutes for books, 5.0 minutes for edited works, 10.6 minutes for databases, and 5.7 minutes for citation databases. Figure 6.5 shows a team-by-team analysis; it includes the 6 teams that met the instructor’s challenges and the Warriors whose game play appeared to be serious but fell short of meeting the instructor’s incentive.

Figure 6.5. Time estimates (in minutes) for answering monastery library questions

Although game players spent the least amount of time answering web, books, edited works, and citation database questions, their accuracy rates were highest for the web and lowest for books, edited works, and citation databases. Most undergraduate students consider themselves to be experienced web searchers. They spent about 2 to 6 minutes cutting and pasting the game’s web questions into a web



browser, navigating to web sites, and finding text that answered the question. They spent the same amount of time, about 2 to 6 minutes, answering books and edited works questions, maybe test driving Mirlyn or consulting one another with regard to choosing one or more listed answers. It is heartening to see that game players spent as long as 15 to 20 minutes to answer encyclopedia and database questions. Considering their higher accuracy rates (62% for both encyclopedias and databases in Table 6.4), it is entirely likely that they conducted research online to answer these questions.

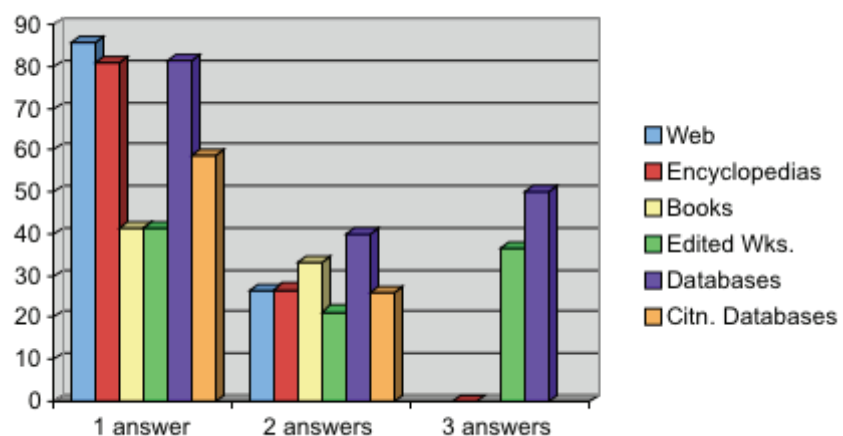
6.5.5 Answering Questions with Multiple Answers

In interviews, game players told us that questions that had multiple answers were difficult. The game gave visual cues whether a question had more than one answer. When check boxes preceded answers, the question had two or three correct answers. When radio buttons preceded answers, the question had only one correct answer. Here is what students said about the difficulty of questions requiring two or more answers:

- “[Questions] with the check boxes, I felt like I always got those wrong. Like the ones where you could select two or three of the answers. Those were more challenging.”
- “Like I agree [about] the check boxes. I would get them always wrong all the time. I would have to like write down what I put down and then [if I got the question again] I would know that I shouldn’t put that answer.”
- “I would definitely say the check box ones were hard because they were ambiguous. I think there was one question... about when someone was born and when he died or something ... I did it several times, I would go and click one and keep clicking and eventually you would find [the right combination of answers].”

Of the total 103 monastery library questions, 55% (53 questions) had 1 answer, 40% (38 questions) had 2 answers, and only 5% (5 questions) had 3 answers. The project team compared accuracy rates for monastery questions with 1, 2, or 3 answers (figure 6.6). Accuracy rates were highest for questions with 1 answer. Interestingly, rates reach into the 80s for one-answer web, encyclopedia, and databases but they stay low at 40% for one-answer books and edited works questions. Accuracy rates were much lower for two-answer web, encyclopedia, and database questions. Rates were low across the board for question types on which players failed to excel (i.e., books, edited works, and citation databases). Only 5 monastery library questions required 3 answers, so it is difficult to draw conclusions for these results.

Figure 6.6. Accuracy rates for questions based on number of correct answers



6.5.6 Sage Advice and Library Study Questions

Game players could find answers to all Sage Advice and Library Study Questions online. Sage Advice questions were comparable to monastery library questions. They asked players to find answers to ready reference questions about the Black Death. Questions almost always included hints that told players how to navigate to ready reference sources on the web, at the U-M Library’s Search Tools, or on the U-M Library’s home page. Sample questions are:

- China may have been the original source of the plague that decimated European populations in the mid 14th century. Where would you look for the most up-to-date information on China's current population and the population of other countries around the world? (Possible answers included search hints for these ready reference sources: CIA Fact Book, Global Statistics, Infoplease.)
- When the plague reached England in the mid 14th century, Edward III was King of England. Find a biography of Edward III. (Possible answers included search hints for these ready reference sources: DISCovering Biography, Oxford Dictionary of National Biography, or Historical Abstracts.)

A handful of Sage Advice questions queried game players about ready reference source genres or about the various search engines that they had to use to search ready references sources. Examples are:

- How do you find encyclopedias in the U-M Library? (Possible answers: Ask a librarian, go to the Reading Room at Harlan Hatcher Graduate Library and browse the bookshelves, or open your web browser to the U-M Library's Search Tools and use Search Tools to find them.)
- To find facts and the answers to simple questions, search _____. (Possible answers: Books, journal articles, or ready reference sources.)

All Library Study questions queried game players about Google, Mirlyn, and the various search engines they used to answer the game's journal-article database and citation database questions. Search hints accompanied most questions so that game players could quickly navigate to a particular search engine and take it for a test drive to answer the question. Table 6.7 lists the number and percentages of correct answers to Library Study and Sage Advice questions.

Table 6.7. Correct Answers to Sage Advice and Library Study Questions by Successful Teams

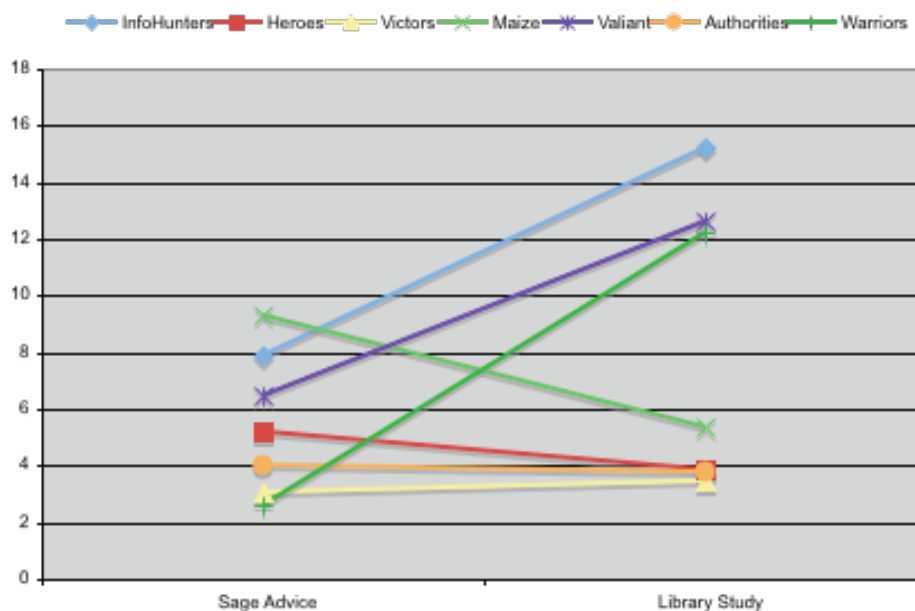
Team	Sage Advice			Library Study		
	Number	# Correct	% Correct	Number	# Correct	% Correct
InfoHunters	41	22	54	12	9	75
Heroes	44	22	50	22	16	73
Victors	30	18	57	10	6	60
Valiant	12	6	50	9	4	44
Maize	7	5	71	4	1	25
Authorities	7	2	29	3	2	67
Warriors	7	3	43	2	2	100
Average #	148	78	–	62	40	–
Average %	–	–	52.7	–	–	64.5

Finding answers to Library Study and Sage Advice questions did not require teams to visit U-M libraries. Instead, they could perform the research connected with answering these questions at their personal computers. Accuracy rates for Library Study and Sage Advice questions were 64.5% and 52.7%, respectively. These accuracy rates were rather comparable to accuracy rates for monastery library questions that players could answer online, i.e., web (67%), encyclopedias (62%), and databases (62%) from Table 6.4).

Figure 6.7 shows how long it took the 6 successful teams and the somewhat serious Warriors team to answer Sage Advice and Library Study questions. All but one of the teams taking about 5 minutes or less to answer Sage Advice questions were the same ones taking about the same time to answer Library Study questions. Three teams — InfoHunters, Valiant, and Warriors — took over a dozen minutes to answer Library Study questions.

Figure 6.7. Time estimates (in minutes) for answering Sage Advice and Library Study questions

Game players had difficulty with Library Study and Sage Advice questions that had more than one answer. They answered 81% of one-answer Library Study questions correctly and only 35% of two-answer questions correctly. They answered 63% of one-answer Sage Advice questions correctly and only 40% of two-answer questions correctly.



Answering Library Study questions almost always involved test-driving Google or one or more search engines connected with journal-article databases, citation databases, catalogs, and encyclopedias. Some game players might have known the answers to easy questions such as the name of the U-M Library's instant messaging reference service or the function of the "MGetIt" button accompanying citations in journal-article databases. To determine the correct answers to almost all Sage Advice questions, players had to follow the search hints, navigate to a particular web page or licensed ready reference source, and make certain observations. The analysis that examined accuracy rates for monastery library questions based on examining texts for answers did not apply to Library Study and Sage Advice questions (see figure 6.4), and, thus, is not repeated here.

6.5.7 Particularly Difficult Questions

The project team reviewed a list of questions to which several teams gave incorrect answers. Of the 491 questions that the game issued to all teams, players gave incorrect answers to 243 (49.5%) of them. The game issued a total of 156 different questions to teams, and two or more teams answered 112 questions two or more times. Of these 112 questions, 66 questions (about 60%) were answered incorrectly from 50% to 100% of the time.

Table 6.8 gives examples of questions that teams answered incorrectly on multiple occasions. These questions stood out in one or more ways. They required teams to: (1) expend effort such as going to libraries to fetch books or searching one or more search engines, (2) observe, compare, or draw conclusions based on reading or scanning texts or performing online searches, (3) know answers based on prior experience or knowledge, or (4) ask a librarian for the answer. Additionally, several questions had multiple answers, a characteristic that game players cited as increasing question difficulty (see figure 6.6).

Table 6.8. Questions Teams Usually Answered Incorrectly

Type / % Incorrect	Question	To answer correctly
Books / 100% (5 of 5)	After building a comfortable level of understanding with encyclopedias, start with this book because its author summarizes what is known about the Black Death from the many books, journal articles, book chapters, and conference papers that have been written on this topic to date.	Players must fetch 3 books on reserve at the U-M Library and scan their prefaces to determine which one summarizes the state-of-the-art.
Citation databases / 67% (4 of 6)	Writing in a 2005 issue of "Genes and Immunity," S. Hummel et al. hypothesizes that the mutant allele of the chemokine receptor CCR5 gene (CCR5-Delta32) which confers resistance to HIV-1 infection might have originated long before the Black Death in the 14th century. What other researchers present evidence that supports or directly refutes Hummel's findings about the mutant allele's origins?	2 correct answers. Players must retrieve abstracts or full texts of listed citations, read them, and analyze what they read to determine the correct answers.
Edited works / 100% (7 of 7)	To find out whether an edited work emanated from a conference, symposium, or workshop, read the introduction, preface, or a special added statement that editors insert between the front cover and the first chapter. Which of these edited works came from a conference?	Players must fetch 3 books on reserve at the U-M Library and scan their prefaces to determine which one was inspired by a conference.
Library Study / 100% (4 of 4)	When you find a really good book that is exactly what you want, what are the most efficient way(s) of finding one or more just like it in Mirlyn (http://mirlyn.lib.umich.edu/)?	2 correct answers. Players must experiment with both author and call number searches in the Mirlyn catalog.
Sage Advice / 80% (12 of 15)	Quickly and efficiently, find the birth and death dates for Richard Mead, a prolific author of works on plague, smallpox, measles, and scurvy.	2 correct answers. Players must notice the dates listed for author names in the Mirlyn catalog.
Sage Advice / 78% (7 of 9)	In the U-M Library's Search Tools (http://searchtools.lib.umich.edu/), Ready Reference sources are given these "types" of designations:	Players must know what "ready reference" means or ask a librarian.
Sage Advice / 67% (8 of 12)	How do you find encyclopedias in the U-M Library?	3 correct answers. Players must visit the Graduate Library's Reading Room or ask a librarian.
Web / 80% (4 of 5)	Which web page(s) best describe the connection between the weather and a plague epidemic?	2 correct answers. Players must read the text of web pages to find references to temperature, humidity, and "the little ice age."

Some players felt that the wording of questions was to blame for their incorrect answers:

- "I just noticed in general that the questions seemed to have a lot of ambiguity in the sense that the way they were worded you could just apply it to any of the possible sources."

6.5.8 Purchasing Exclusive Licenses and Issuing Challenges

The first team to play the game on November 3 was the InfoHunters, and this team purchased 15 of the “Hidgeon” game board’s 17 exclusive licenses to monastery libraries before another team signed onto this board. On the game’s seventh day, InfoHunters earned its 18th scroll and controlled all monastery libraries on the “Hidgeon” game board.

Of the 13 challenges opponents issued to InfoHunters, 3 challenges came from opponents who had earned only 1 or 2 scrolls to date, and, thus, had available only 3 to 6 bibliography entries compared to the InfoHunters who had 54 entries. When both the Maize and InfoHunters teams had 18 scrolls, the InfoHunters won 2 challenges versus the Maize team. InfoHunters’ lone loss came from the Maize team when InfoHunters failed to complete the Maize team’s challenge to them within the 4-day deadline. As a result of winning the challenge, Maize wrested control of 1 of the game’s 3 web libraries, the lowest-valued license in the game.

In the interviews, an InfoHunters team member told how challenges could be improved so that a team’s inaction was not to blame for the loss of its licenses:

- “If you log on, you don’t necessarily know if the challenge has been put against you, and that’s how we lost one of the properties because we had no idea that there was a challenge out, and we would have done something if one of us would have known. And like I said an email notification that says you’ve been challenged so you could actually go do it right away and having it in less than four days because I think a challenge like people should get on it if it’s important to them.”

Only 1 of 13 challenges was a complete challenge in which both challenger and owning team submitted bibliography entries to the game. The other 12 challenges were incomplete with either challenger or owning team or both failing to submit bibliography entries within the 4-day deadline. A redesign of the *Defense of Hidgeon* would have to include automatic email notification to challengers and opponents so that both are aware of a pending challenge.

On the “Plague” board, the Heroes team began game play on November 7. Heroes game play was downright lackadaisical — the team signed on periodically, earned a few scrolls, and purchased about half of the number of licenses that were available to them as a result of their correct answers to monastery library questions. For the game’s first two weeks, the Heroes had almost no competition.

On November 12, the Conquerors signed onto the “Plague” board for the first time, answered 1 books question correctly, but failed to make a purchase. On November 15, the Warriors signed on for the first time, earned 4 scrolls, and purchased 1 exclusive license. At the time of the Warriors’ activity, Heroes had earned 11 scrolls and purchased 6 licenses. The Warriors challenged the Heroes 3 times, winning 1 challenge because the Heroes failed to respond within the 4-day deadline, and winning 1 challenge because their challenge score exceeded the Heroes’ challenge score. On November 19, Heroes controlled 14 licenses and won its challenge for the Warriors’ lone license because the Warriors failed to respond within the 4-day deadline. After the Heroes retired on November 26, the Warriors purchased only 2 of the licenses that were in the Heroes possession. When the game ended, the Warriors owned 2 licenses and earned 9 scrolls. Considering the closeness between the total scores of the Heroes and InfoHunters teams, purchasing all licenses on the “Plague” board and challenging for the two owned by the Warriors could have been sufficient for overtaking the InfoHunters on the Leaderboard.

During interviews, the challenge was a rare topic of conversation. Here is one player’s comment that underlines the need for teamwork to complete challenges:

- “We never really did the challenges but I think if a team was to do the challenges that would be a value to do as a team because there was so much homework involved.”

Another player recognized that challenges should take into account the reliability of selected bibliography entries. Whether she arrived at this realization as a result of reading about challenges in the game manual or as a result of her experience with a challenge, her comment is an astute one because it demonstrates the type of wisdom we wanted game players to develop as a result of playing the game.

- “This was the first time I was [doing the challenge] and there was like a lot of resources you could choose from, like 12, and so I kind of did a process of elimination and like eliminated all the web sources because I figured they weren’t as reliable as encyclopedias and stuff, and so then I just focused on those and I guess from there I just chose the wrong ones.”

The challenge could have been a potent tool for teams who trailed during game play to climb up the Leaderboard. Unfortunately, it appears teams did not want to take risks that might adversely affect their meeting the instructor’s incentive. Instead, most teams used the game’s basic functionality to earn 18 scrolls with a 40% accuracy rate that was sufficient for meeting the instructor’s incentive of a half-letter grade increase.

6.6 An Analysis of Game Features and Functionality

SI 110 students’ game play and post-game interview remarks enabled the Storygame Project team to learn about the game’s shortcomings. As a result, they could improve the game and generate recommendations for the design and development of future information-literacy games generally. This section highlights troublesome game features and functionality.

6.6.1 The Hospital: A Real Show-Stopper

When a team’s game piece landed on the Fox Hunt space, the game automatically sent it to the Hospital which would issue a task to the team that required them to visit a particular campus library to earn a code that released their game piece from the Hospital (see figure 3.15). Our intentions were good: Hospital tasks introduced players to campus libraries where they could learn how librarians and specific library collections could help them now and in the future. Unfortunately, we did not expect teams would land on the Fox Hunt space so many times, and we did not anticipate how disruptive Hospital tasks would be to the overall flow of the game. Here is what students said about the disruptive nature of the Hospital space:

- “People on [my] team were all pretty friendly so we just kind of sat in a room one day and tried to play but we ran into issues of all of us sitting in the same room trying to play. Like we all had one computer on the game and the rest were doing research ... like when you got put in the Hospital and we kept getting in the Hospital and it’s really like a big pain to go get yourself out of the Hospital. We tried to play ... and we all ended up in the same room but two turns in we ended up in the Hospital again and it just ruined that whole session.”
- “The Hospital that was a big pain in the you know where if you’re on it and you already have good momentum and all of a sudden you have to stop and go and track down a librarian who like I was once there for 15 minutes so they could try to figure out where the code was. But I mean the idea of having to do that extra thing is a nice idea maybe just incorporate it so [it works].”

The project team worked extensively with their librarian contact at the U-M Library to make sure library staff knew about the Hospital task and would respond accordingly by giving students the code that would

release them from the Hospital. Our contact assured us that she told her librarian colleagues about the Hospital tasks and codes at staff meetings, sent them email reminders, and asked them to file a memo in their library's notebook where they insert announcements, events, and typical course assignments they are likely to encounter when they staff a library information desk.

Despite everyone's good intentions, students had a few bad experiences. Sometimes the memo was not filed in the notebook or a particular library did not have such a notebook for communication. Students might have talked to temporary library staff who had not been briefed about the game. Although students understood that Hospital tasks were meant to familiarize them with campus libraries and interacting with librarians, their experience with the Hospital quickly turned sour because landing in the Hospital disrupted the flow of the game and they had no guarantee of a quick release from the Hospital due to how knowledgeable librarians were with regard to Hospital tasks and release codes.

- “I can understand that it was a cool twist to the game but the problem was that most of the librarians ... didn't really know what was going on so were a lot less motivated to actually go through with the questions we were supposed to ask them. It was more like, hey, can I have this pass code, and yes, you can.”
- “Speaking of the Hospital, maybe it was me but I had a lot of issues. Like I would go to librarians and they would want to help me, they would try but somehow like three times I went, and I got the wrong code, and ... I came back and I told my group, and they're like no that's not the right code. And then two of the times ... one of the librarians didn't know about that much.”
- “I had one librarian who was actually interested in showing me what the question was all about. And I had another one [who] was literally annoyed that I had asked her. It was really kind of not fun ... especially if the library is angry at you.”
- “The time I went I thought it was cool the way that it was set up to have to look up the information ourselves because it put like another challenge, but it was a healthy challenge but when it came to getting the code that was the problem. The reference librarian would help me. Her boss or whatever had to leave us the code, or deliver the email that it was so she had to email me the next day so I eventually got the code and it worked for me.”

This student's comment about the Hospital says it all:

- “Going to the hospital was a pain.”

We believe students understood that there was merit to the Hospital task; however, the Hospital became a nuisance for teams whose rolls of the die landed them repeatedly on the Fox Hunt space. If we were to redesign the game, we would put an upper limit on the requirement for teams to perform the Hospital task. For example, after the third time a team gained release from the Hospital, the game would convert the Fox Hunt to a free space, display a different message, for example, a scenario about a fellow hunter's fall, and give the team the option of staying put or skipping ahead to the Hospital space where they would visit their fellow hunter.

6.6.2 Feedback on Incorrect Answers to Questions

The Storygame Project team was deliberate about its decision to give game players feedback for their correct answers and omit it for their incorrect answers. Our reasoning was threefold: (1) we wanted to avoid giving teams who gave an incorrect answer to the question the first time an unfair advantage the second time, (2) we needed to divert time, resources, and energy to other important development tasks, and (3) quite

frankly, we doubted teams would ever encounter the same question twice because we seeded the game with a sufficient number of questions and programmed the game not to issue the same question to a team.

In retrospect, our decision about feedback was not a wise one. Game players would have been receptive to feedback after submitting an incorrect answer because they wanted to know why their answer was incorrect. Scrutinizing feedback to determine why their answer was incorrect, game players might have learned something new that they could have used to answer subsequent questions or to apply to their future information-seeking episodes.

Here is what game players said about the need for feedback after they submitted incorrect answers:

- “If there was more than one [answer] and you got it wrong, there were a lot of times I was kicking myself because I didn’t know why [I got it wrong] so a better explanation of why you got it wrong.”
- “I have another improvement. A lot of the times I was convinced that I had the right answer, and it was not the right answer, it was wrong ... but I would have liked to ... know why I was wrong and which answer was the right answer just because I was kind of left in the dark ... Oh well, I was wrong, go to the next question.”

Students liked the search hints that accompanied questions and gave them instructions for navigating to the right web site, catalog, or database. At least one player suggested that the game’s feedback be designed like these search hints:

- “The game is not very difficult ... It’s ... like here are your instructions, go to this website, type this, everything is very clearly explained to you so you don’t really have to be very good at research or very intelligent to be honest to get the answers right, you just have to follow the instructions, but I don’t think eliminating those instructions would be very good either because you need to know what to do so I think you have to find a median for it between that but I don’t know how you would do that honestly.”
- “More feedback [that is] like tips [that tell you] what to do.”

Here is a comment from students who wanted the game to add popups or marginalia telling them exactly where the answer resided on the page of a journal article, encyclopedia entry, or the web. Adding such notes to sources would be difficult to accomplish because most sources are not controlled by the Storygame Project team or the U-M Library; however, their comment draws attention to the need for feedback for incorrect answers.

- “Me and my teammates actually talked about this like we all sat in the same room and got to the same page and we would be like searching like we would still be almost like guessing what the answer was because it wouldn’t jump out at you on the page which is fine. You have to research it, read the page and figure it out ... We wanted to have almost like that page like a little blurb [that] highlighted, like okay, here’s the answer, this is what you should have found, and like this is not right because of this. That way we would have known the right answer, and we would have known then for future questions like how to look. We got to the right page so we learned how to use search tools, then I guess maybe our own personal research skills weren’t good enough to find the proper answer, and [when] we got it wrong, we wanted to know actually where it actually was.”

6.6.3 Team versus Individual Game Play

The Storygame Project team recognized that earning 18 scrolls from the game's 6 library types would not be an instant task. It would require a considerable amount of research on the part of game players. Thus, the project team urged students to sign up in teams of 4 to play the game and issued one password and one game piece per student team.

Only one person from a team could be signed onto the game at a time. It would have been a significant technical accomplishment to create a game that synchronized game play across team members who were signed onto the game on different personal computers and web browsers. Instead, we envisioned all four team members working at laptop computers or in a campus computer lab at nearby desktop computers. One teammate would sign onto the game and use email to task their three teammates with navigating to one of the three online or on-reserve resources cited in the question's possible answers to determine the correct answer. Teammates would do the research and tell the one teammate signed onto the game to choose one or more listed answers. The teammate signed onto the game would then submit the team's answer(s), find out whether their answer(s) were correct, click on the die to move onto the next game space, and task fellow game players with the research for the next question. Some game players described how they tried playing the game like this:

- “People on [my] team were all pretty friendly ... so we just kind of sat in a room one day and tried to play but we ran into issues of all of us sitting in the same room ... Like we all had one computer on the game and the rest were doing research ... like when you got put in the hospital and we kept getting in the hospital and it's really like a big pain to go get yourself out of the hospital. We tried to play ... and we all ended up in the same room but two turns in we ended up in the hospital again and it just ruined that whole session.”
- “There was one point where three of our team members got together to play the game and it lasted about 20 minutes before we got sent to the hospital and no one wanted to go to the library but when we were together we had like three laptops ready and we were going to send people to different databases but it doesn't really work because there's only person who can be in the game at one time. The person that was in the game at the time would have to basically tell the other people with the laptops how to get to the websites to put in the question to the databases when it could have just been quicker for that person that's logged into the game to do it themselves.”

Other students liked the idea of teams because they could share the workload, signing on and off when they were free to play, expecting teammates to play when they were busy with other coursework, and relying on teammates to spread over the campus to do game-related tasks.

- “Teams are handy because if there's something you have to go to North Campus for and you have someone on North Campus ... That's why I was glad we did teams but I just thought it was frustrating because the first time I went to play it I was excited I answered the first question, I had to go to the library, and I did that, and I came back and when I tried to re-log on it kept like logging me out whenever I tried to answer something because the server was down. So I couldn't do it then and then it was like I got busy.”
- “... But just to share the amount of stuff you had to do kind of lended itself to more of a team environment because it really could get exhausting kind of repetitive, kind of boring, just doing the entire 18 scrolls by yourself.”
- “We would just decide like I'm free this weekend I'll play and then they played for a couple hours, got a couple scrolls and then another person decided to play. That's how it worked.”

- Teams ... it's nice to have them because you can be playing all day and you have schoolwork and whatever and you have a paper due tomorrow, somebody could be playing right now from your team and you don't have to be playing, like you could still be doing something even though you're not playing yourself.

A few students were wary that the team concept idea would result in the “free rider” problem — a concept they had studied in class — in which some teammates make all the contributions and others make none but all teammates reap the rewards.

- “Teamwork tends ... especially when it's kind of anonymous, it encourages the free rider problem ... There's no way to ensure that everyone is contributing. There's no real benefit having a team unless everyone is willing and able and signs on and plays the game which you can't enforce, ensure, or even check up on, and you don't interact with your team really because there's no attraction within the game.”
- “Instead you've got to deal with coordinating everybody and dealing with the people who don't contribute anything to your team ... You know other people kind of make it more difficult especially when there's no tangible benefit to having everyone on your team unless you know everyone is contributing.”

Several students suggested that the *Defense of Hidgeon* was a game that could and should be played on an individual basis:

- “I feel like the game is better played and better made for like individual game play.”
- “About the style of research you needed to do lends itself to an individual basis just because [the game] kind of [tells] us where to go.”
- “You could have an option of doing it as a single player.”

The suggestions students made about how to improve the game for team play involved giving one player control while team members observed his or her actions and used chat or email to communicate with one another. Even better would be a capability for the controlling player to pass control to fellow team members. While such a capability would have been desirable for the *Defense of Hidgeon*, it was not possible within our time and budget constraints but, given more time and financial resources, it would be a top priority in an enhancement of the game at hand.

- “[Allow] the entire team to login to the game [but let them] designate only one person to be able to advance in the game. So one person gets the control but everybody else could login and see what's going on with their team. I think that would be a lot better ... a mirroring effect.”
- “I think a great thing for the game would be to make it able so a team could be [playing] at the same time ... They could chat with each other and make moves together [even though] they [w]ould be working together from remote locations. You could actually ... have like a little chat going and one person is doing control and they all discuss what they want to do. I understand you can't have four people controlling it but they can switch around the control between the four of them online, you can pass it off. And that would really allow for much better teamwork.”

6.6.4 Communication Technologies and Game Play

This section focuses on the communication technologies that students used during game play. When their progress in the game required decision-making that was out of the ordinary, for example, doing the legwork

connected with the Hospital or responding to a challenge, they used electronic mail, Facebook, or cell phones to contact one another. Here are their comments in this regard:

- “I didn’t really talk to my group members. I don’t think I could actually point them out in this class. We all emailed each other which worked really well to communicate and we would figure out what we wanted to do in terms of retiring and what not and in terms of the Hospital.”
- “My group used cell phones just because we knew each other’s numbers. We used it just to figure out a time to meet.”
- “The only time I really saw my teammates was we talked a lot about the games, and we signed up, after that it was all done by email, and when we did talk by email, it would be like we just did this, do you guys want to stop now or finish? Are you tired, yes or no? And we got group consensus for anything big like that, but we really didn’t get together, it was all through email.”
- “I was going to say the group email list ... we just made a group email list.”
- “Facebook. We just needed to be able to find so we just befriended each other and started messaging via Facebook.”

Students wanted online chat and a mirroring feature that would enable them to connect to the game from different locations and see what was happening to their game piece so they could advise the teammate who controlled the board regarding their next move or decision, and, perhaps, ask their teammate to pass game-piece control to them. Here is what students said in this regard:

- “I think [it would be] a great thing for ... a team to be [playing] at the same time ... They could chat with each other and make moves together [even though] they [w]ould be working together from remote locations. You could actually ... have like a little chat going, and one person is doing control, and they all discuss what they want to do. I understand you can’t have four people controlling it but they can switch around the control between the four of them online, you can pass it off. And that would really allow for much better teamwork I think.”
- “If you allowed the entire team to login to the game so it does designate only one person to be able to advance in the game. So one person got the control but everybody else could login and see what’s going on with their team I think that would be a lot better ... a mirroring effect.”
- “... But the thing is only one person on IM [instant messaging] could see what’s on the screen what’s going on and if you’re always able to like ... everybody [could] log in that was part of a team they could all see what’s going on, they could all contribute, and I think that would make it a lot easier.”

6.6.5 Single versus Multiple Game Boards

The Storygame Project team knew in advance that the *Defense of Hidgeon* might have to support as many as 18 teams during game play. The project team’s solution was to assign teams to multiple game boards. It was not feasible to feature game play on a single game board for these reasons: (1) the size of computer monitors would not be large enough for displaying a larger game board bearing at least twice the number of game spaces and (2) with so much competition, it might be difficult for a team to acquire a critical mass of game assets to enable concentrated game play such as license purchasing and challenging.

In SI 110, 13 teams signed up to play the game. The project team divided these teams onto 2 game boards named “Hidgeon” and “Plague” and bearing 7 and 6 teams, respectively. When some game players noticed

teams on the Leaderboard were split across 2 game boards, they wondered whether teams on one board had an unfair advantage. One interviewee had this remark:

- “I think the problem with the competition of the game is that if you notice the two highest scoring teams are on different boards so they can’t really fight for those library spaces and try to knock one of them down so it’s kind of almost arbitrary like who’s in first and second in that sense because they’re playing a different game, they’re not playing with each other so you really can’t see who’s at the top.”

An easy solution to the multiple board problem would be a game featuring several rounds. In round 1, game players sign up and play on a particular board with their classmates. Winners of round 1 advance to round 2 with fewer boards, winners of round 2 advance to round 3 with still fewer boards until the winner emerges as a result of winning game play on 1 final board. Alternatively, the *Defense of Hidgeon* could be redesigned making it possible for teams to jump from board to board. For example, having paid a special tax to all teams on the new board, the jumping team could be as aggressive as it wanted to be, purchasing unowned licenses and issuing challenges to teams for the licenses they owned.

In the game SI 110 students played, the two teams that placed first and second were on different boards but a variety of factors could have changed the outcome. On the “Hidgeon” game board, InfoHunters signed onto the game immediately, and they engaged in game play that earned them almost all scrolls and exclusive licenses. Had two or more teams been as active from the very beginning of the game as the InfoHunters, the outcome might have been different. For example, maybe three very active teams on the “Hidgeon” game board would have earned all scrolls and about a third of the game board’s exclusive licenses, and spent the remainder of the game passing licenses back and forth as a result of won and lost challenges.

On the “Plague” game board, the Heroes only signed onto the game after the instructor announced the incentive. Additionally, this team’s game play was lackadaisical and irregular. Had two or more teams signed onto the game two or three days earlier and engaged in game play that resulted in scroll acquisitions and license purchases, it is unlikely that the Heroes would have controlled so many monastery libraries. On both boards, no team mounted a sustained campaign to challenge the team who was in the lead. Instead, teams took a risk-adverse approach, playing to achieve the instructor’s incentive, and, with some luck, second- or third-place finishes.

One interviewee vented about the game’s time penalty that figured into final scoring:

- “I didn’t like the fact that the game has the time factor in it because I didn’t start playing the game like until towards the end when other people did it at the beginning and ... even though I answered the questions just as correct as they did, I got downgraded 2,000 points because I answered it like two weeks late[r] which is like unfair because I had other homework that I had to do earlier in the semester and I had time right before Thanksgiving to start playing so, I don’t know, I feel like that part of the game is unfair.”

In retrospect, the game’s time penalty worked exactly as planned. It rewarded the InfoHunters who got a jump on all other teams, starting the day that game play began and engaging in game activities for which they reaped benefits through the game’s scoring algorithm. Although the interviewee above is correct that her team was penalized for beginning the game later than other teams, the extent of the penalty was dictated by her team’s level of accuracy in answering questions. In fact, if her team had answered all of the questions they attempted correctly, they would not have incurred any time fee.

6.6.6 Other Game Features

Interviewers asked students to make suggestions about improving the game. Here are two comments about making gold, the game's currency, more versatile and relevant to game play:

- “If you were able to use your gold to give you power. Like a lot of time I would only need a scroll from one or two libraries so like if I could spend like the 200 or 300 in gold to get an item that makes me move there automatically or automatically gives me the scroll if I'm having trouble in a certain library.”
- “Like the gold has nothing to do with the game. Sure I have 700 gold ... but I never was like, oh, I can spend my gold now.”

Some students identified game genres that might be more appropriate than the board-game genre of the *Defense of Hidgeon* for future information-literacy games:

- “[Use] an epidemiology topic. Like this [health crisis] is happening ... You look at different symptoms and like actually taking more of an active role than this [*Defense of Hidgeon*] is what it is and we know all of this and it's your job to look up these already picked sites. It [would put] players in a proactive role so they actually felt like they could do something or that they could pursue their own ideas within that. Like well I think it's this so I'm going to research these topics and you can get shunted back onto course.”
- “As long it would be like a game show style game like a host and he would ask questions and you had like trivia and you could maybe tie it into orientation with having it be like Michigan trivia like about the school and where things are located on the map or that kind of thing and you could tie in maybe like academic trivia into that too with the databases.”
- “What if you did different editions? ... like a sports edition? ... We'll let's say Trivial Pursuit, you know how they come out with like ... obviously like not the 80s edition but like random other editions like kids who like history grab a history edition.”

Students confessed that playing the game was not fun. Others told us how to enhance game play that would increase the fun.

- “I didn't think it was a fun game.”
- “It's not like I went home excited to play but it wasn't the worst thing I had to do. I put off doing other homework to play it.”
- “I actually like the idea of edutainment ... I think it was a good idea and a good way to learn about [library research]. I think that once the kinks are out of [the game] it would be better especially if there are better incentives but I do like the idea of trying to make it fun to learn how to do this. It can't really be that bad to try to make it fun.”
- “[Add] little side interactions when you're doing something ... I mean like you're playing like a tic-tac-toe game with the facts you find like something that was more of a game that was entertaining.”
- “I think making the game itself more like entertaining and fun and colorful like Mario Kart — it is like you do the stupidest stuff [playing Mario Kart] but it's just so fun, it's so colorful.”

One student wanted game play that would include her friends:

- “I realize like when I couldn't be with my friends to do this it was a big disconnect.”

6.7 What Did Game Players Learn About Library Research as a Result of Playing the Game?

Introducing SI 110 students to the game, the PI did not tell them what she expected the game to teach them, instead she issued a request for them to think about what the game was teaching them. During focus group interviews, the project team asked students directly what they learned from playing the game. This section answers the question — what did game players learn about library research as a result of playing the game?

6.7.1 Negative Learning Experiences

When the project team asked game players what they learned about conducting library research, some students said that they learned little because they already knew about online searching and library research. Upperclassmen were quick to mention this. Here are students' comments in this regard:

- “I just feel like most of us already knew most of the tools that we used during the game to like search to see which article is reliable and stuff like that.”
- “[I learned] nothing. Because I knew how to search the database already. Maybe because I'm a junior, I knew how to use the databases. Maybe I got familiar with like one or two [databases] better. But about the Black Death it was like a lot of the answers you could find by using the find feature in Firefox or whatever so I would just go to the task and search and if it was there and then I would say yes it was there and click. I wouldn't even read the title.”
- “I think that it would be a lot more efficient ... to just write a paper and have your teacher telling you, okay, you have to use three sources from a database, three sources from an encyclopedia or whatever, and putting those restrictions would force students to learn, and they would do it, and they would learn it on their own.”

Toward the end of the focused group interview, the PI was direct about telling students what she wanted them to learn from the game — where to start their library research, how to build on a good start, and how to evaluate what they find. In response, one student told us that knowing this would have increased her interest in playing the game:

- “Tell us exactly what you just said. Tell us why it's useful, don't say go and look up something ... Saying exactly what you just said made [the task of learning how to do library research] more useful and more of a desire in that 5 seconds so that I might now want to [play the game].”
- “Everything [Karen] just said about research and how you should go about it, I would love to have on a sheet ... and put it at my desk and tape it to the wall. Then when I'm writing a paper, I would refer to that and then it would be real world. I would be using it to write papers and you wouldn't have to change it next time.”

We stand by our decision to keep mum about what we wanted students to learn from game play because we did not want to predispose them to act or think in a particular way. Instead, we were able to learn from their observations especially with regard to introducing students to games in the future.

6.7.2 Positive Learning Experiences

When students told us their positive learning experiences, they singled out the game's ability to teach them about the tools of research. Here is what they had to say in this regard:

- “I actually learned a lot about Search Tools and how to use it because previously I had no idea how to use any of that stuff like the little hints that you gave were really helpful and you can see how it applies to any other type of research you had to do.”
- “Doing the research for the game allowed us to do really helped me. I’m in the middle of two different papers and I’m using Mirlyn for it, I’m using ProQuest, and I’m using other things for it, so I was able to learn a lot that will be able to help me.”
- “I never searched databases before so I learned some searching ... so the questions made you do it so I guess I’m more familiar with searching the databases for papers.”
- “[I learned] how to research and actually get results that will help your paper or whatever it is you’re doing.”
- “I think another big part of it was the database part. It kind of showed you how many databases are really available to us as students. We have so much different stuff — about a ton of different information. I feel like it also kind of told you how to do the searches, like how to find a specific database like in there you could do all research or like subjects or it just kind of show you all the actions needed.”
- “The [databases] all had different interfaces, they weren’t all exactly the same.”
- “So if you look at one [database], you would be familiar with it. Like after I answered like two questions on one database, I already knew how to use it like I didn’t have to think about it.”
- “I feel like ... the best part about the game is because you’re going to be learning how to use the databases you’re going to be using in real life.”

Some interviewees remarked that they benefited from game play because it made them do research tasks connected with various online tools over and over again and confront and solve important problems during the research process. Here are their comments:

- “I actually took a mini-course on how to better [search] ... JSTOR and different things like that ... Someone else mentioned that this [game] is so tedious and so repetitive like doing an assignment ... But [the game] is actually like a real life circumstance and you’re actually having to actually execute a question and put in actual research and stuff like that. And yes, it was repetitive but repetitive in the sense that it actually kind of nails the topic into your head and then you know the topic better.”
- “We had a guest lecturer come in from the library, and he taught us how to use ProQuest and things like that. I wrote stuff down but I didn’t really remember it so when I went to use ProQuest, some of the things I got confused but then when I had to do it for the game and it was more like step by step with the hints and what to do, what to type in, what to click, for me that helped me a lot more to learn it, and now I know how to do it just because we were able to copy and paste and go directly back and forth whereas in a lecture form. I don’t know if this is just me, I don’t necessarily gain everything I can out of lectures but [the game] is more like visually designed.”

Two students qualified their positive learning experiences saying that the game took longer than traditional approaches to learning about library research:

- “I did learn [about searching databases] but it took five times as much time.”

- “So basically the game makes me figure it out on my own, with your instructions, but I feel like if someone teaches me like a librarian shows me on a Power Point like how to do this and then I do it myself once, I learn in like five minutes. [The game] is effective but I think it’s inefficient.”

6.7.3 Metacognition: Thinking About Doing Research

Students who expressed positive experiences about game play focused their comments on the “how-to” connected with library research such as learning names of databases, becoming familiar with a particular database’s content, choosing databases using Search Tools, retrieving useful results, and searching particular databases. Students did not explicitly say that the game taught them how to think about what they were doing or give them opportunities to do so. There was an element of thinking about research in this student’s response to the PI’s question about how the game’s libraries were ordered on the game board:

- “I wonder if you could order the [databases] like how good the resources were. Web resources might not be as reliable as the last ones were I think databases or encyclopedias. I’m not sure ... Encyclopedias seem like more reliable than websites ... The information is accurate, and it has relevance, it has more relevance because it’s more ... more has to be true than Wikipedia, like you can just go to Wikipedia, and it might not be true. Kind of like monopoly — like the first ones are always really cheap and then at the end it’s really expensive.”

In fact, ordering the game’s monastery libraries was a very deliberate task of the project team. Source reliability was our chief concern so we put the least reliable sources — libraries specializing in web resources — as the first ones players encountered on the board. Granularity was also a key ordering factor. Libraries where researchers were likely to retrieve broad-based overviews of topics — encyclopedias and books — came after web libraries on the game board. Game spaces for libraries where researchers could achieve mastery and specialization in topics — edited works and journal-article databases — were the last ones players encountered on the board before they repeated their travels at the beginning. The order of these sources adhered to the GenSpec Research Model that was the inspiration for the game and, ultimately, what the project team hoped students would learn as a result of game play (see also section 1.2).

6.7.4 Student Preferences for Games and Other Approaches

Interviewers asked students whether they preferred learning about library research from playing a game such as the *Defense of Hidgeon* or more traditional approaches such as lecture-demonstrations, short courses, web tutorials, etc. Student remarks were varied. Some preferred traditional approaches:

- “I don’t think that it needs to be in the format of a game. Like I don’t really see what benefit you’re getting of having that format of a game. You could benefit just as much from maybe offering like a free seminar on how to use the tools that the university offers like a seminar on how to use ProQuest and Web of Science and things like that. That way someone is physically showing you instead of you kind of digging through all the programs.”
- “Maybe if you can take a course or something like that and people know what they’re getting into.”

Others saw merit in games:

- “I think the game is a really good way of teaching us because some of the seminars frankly suck, like sitting there, and it went in one ear and out the other, and especially like a first semester freshman you’re not going to go to it. I think another way that this idea of

researching could be disseminated through the university is really make it like a responsibility of first-year introductory level instructors — making their students like actually write these papers [just] like Bob [SI 110's instructor] does and helping us figuring out where to find these sources because in order to really learn it you need to use it in action. The game is helping to kind of perpetuate that and actually using it in a paper will really get to there. I think a lot of ... teachers who teach first year courses kind of forget that and maybe assume that we know how to do it where really the university as a whole ought to look at how students do research.”

- “[The game] is a really good resource. It’s reassuring before you’re thrown into your first research project and you’re like, oh, I’ve got to use these resources, I’m not entirely sure how.”

Alternatively, students could choose between the two approaches or enroll in a seminar that would combine game play and traditional approaches:

- “I think it depends on the person because you know some people might think if they go to a lecture, I’m done with it, let’s go, for all the people would be like lecture, boring, I’d rather try this game and go for it.”
- “Maybe you could have a seminar where you teach how to use this by using the game and maybe each person can come up and do one part of the game or then people can work on it. Kind of a long seminar with using the game as the tool to teach it.”

Several students were adamant about incorporating game play into the course syllabus and requirements of the course. When they enroll in a course, they want to know right from the start what is expected of them and, should game play be a course requirement, they want to know how their game play efforts will figure into their final grade for the course.

- “I feel like not a lot of people would want to voluntarily [play the game] so I guess my only answer is just to make it a requirement of the course, make people do it, make them go through all that because, you’re right, the principles behind the game I feel like are worth it and if I had it all of it on a piece of paper, like, hey, this database, this database is good for chemistry, bio, whatever in ProQuest, that’s good to know but at the same time to have to go through hours and hours of the game it doesn’t seem worth it, at least to me. For me, like I did the game but it wasn’t like I got huge incentive to keep chugging away. I’d get bored with it or get annoyed with it and be like screw this for now ... [but] I feel like the principles behind it are good.”
- “Like to me, I thought if you would just have given it to us as an assignment for a grade, we probably would have worked harder.”
- “It’s just motivating people to actually see that this [game] is something that’s going to benefit them and something useful for them to be learning from.”
- “I know I was just turned off to [the game] because the timing and not knowing about it in advance.”

Some students said that this project’s game play was not synchronized with their needs. Speculating about what times were the right times to learn about library research, they mentioned orientation, freshman writing seminars, and prior to doing their first writing assignment.

- “I think if we got all the tips like we did in the lecture like if there was a way to get the lecture to people ... It’s not like people are going to volunteer to sit in a lecture and learn about deep web resources ... I can’t say whether that would be a good way to get people to it but I think

that having an introduction before you have to use it for a paper and you're frantic already.”

- “I think maybe a part of the orientation would be a good idea and a good way to do it because like these incoming freshman really don't have any idea about how much information they can get at all these different databases so I think that would be a good idea.”
- “If I had it at the very beginning of the year, then maybe it would have been more informative, more like new information.”
- “I actually thought the freshman [writing] seminars were a good idea ... If there's a particular subject that you would like to become more engaged in, you actually are much more motivated to go ... deep in terms of research in the databases on the subject.”

Toward the end of the focused group interview, the PI was direct, giving students a summary statement that told them what she wanted them to learn from the game — where to start their library research, how to build on a good start, and how to evaluate what they find. In response, one student told us that she would have benefited from this very statement and referred to it when the moment was right:

- “Everything [Karen] just said about research and how you should go about it, I would love to have on a sheet ... and put it at my desk and tape it to the wall. Then when I'm writing a paper, I would refer to that and then it would be real world. I would be using it to write papers and you wouldn't have to change it next time.”

6.7.5 Timing Game Play During the Semester

Students were in agreement that game play should come early in the semester. It should come before assignments that require writing and library research, and it should come before mid-term examinations.

- “I would say earlier [in the semester] because then people have a longer time to do it. It's more likely to introduce them to things that they might not have already learned. It might then also ... people are just trying to ... get into the swing of the school year and you can kind of start incorporating it into your schedule rather than throwing it on top of everyone when we're already swamped. That way also it's kind of a cool incentive to start playing earlier, you have more time, less rushed, you can take better care of your questions.”
- “Also I agree if it was earlier in the semester it might have been better. I think just when it was, everyone has just been kind of crazy with work.”
- “But the problem of putting it right on top in the middle of your semester if you're trying to juggle all these different things is when that happens.”

6.7.6 Why Did Students Choose Not to Play the Game?

The Storygame Project team asked SI 110 students in focused group interviews why they did not play the game. One major reason was time. Students could not fit game play into their busy schedules. Some signed onto the game, played for a while, and realized they would not be able to devote much time to game play, and others encountered something about game play that they did not like.

- “It was never at a convenient time — it would be late at night or I wasn't feeling great ... It just didn't really work out with my schedule I guess.”
- “It was so time consuming and to like sit and go through articles. Like I'm so busy, I have so much stuff, and I thought it was going to be really easy and just look up stuff in articles and find it, and I was like I don't have time for this at all.”

- “I signed up [to play and logged onto the game] a little bit later, and again, every time that I logged on, we were sent to the hospital.”

Other students passed up game play because they did not see relevance between the game and SI 110 objectives:

- “Personally it just seemed like it was going to be a huge time sink just to do mindless research just to find answers to questions with really little motivation to do so.”
- “If I felt like I was learning more out of it, there might have been more incentive to do it. I don’t think and even if it was related to school like that’s what we were supposed to be doing like learning.”
- “I think if I was taking a class for it like I would already have an interest in the subject ... so if I took a class I might be interested in actually learning it [and that is how] I might have tried to meet that need.”

Some students felt that they already knew what they would learn from game play. Also they cited the presentation that a U-M librarian gave to their class and did not think that they would learn anything new from game play.

- “When we like had the demonstration in class like about the web tools and stuff, you kind of learned all that, and [when] we saw the game promo[tion] in class it seemed like I had known most of the information, and I didn’t know how much I would like gain from it by playing.”
- “I just felt like I was pretty knowledgeable about researching whether it was from databases or web sources and thought like it wouldn’t be that big of a learning experience.”

Some students felt that games were inappropriate for conducting the serious business of scholarship and academic inquiry. In fact, the very idea that someone would use games to teach them came across to them as “annoying,” “arrogant,” and “demeaning.”

- “To me, like having it as a game, it’s more annoying to me than just an assignment. It comes across as arrogant, almost like, [do this because] this is fun and it’s not [fun].”
- “I kind of agree in a little different manner. I think that having it as a game, I felt it almost like demeans us. Like when I think of edutainment or whatever word you’re going to chose to call it, I think of my little 4-year old cousin who sits there with Leapster and does like educational games that he loves.”

Some students thought game play was meant to teach them about the Black Death. Because they were not interested in the Black Death or had studied this event in the past, they passed up game play.

- “For me it was also the time issue and the appeal of it. I’ve done a lot of research through JSTOR, Lexis-Nexis, and everything, and so I didn’t feel like this was an exercise that I would have gotten much from especially because the black plague is such an obscure topic, and I feel like doing research on it wouldn’t have given me as much of a learning experience as I wanted to garner from it.”
- “No, I don’t think doing research on the bubonic plague is like what I do in my spare time.”
- “I would like not play at all just cause like I felt like the topic to me was very boring to me.”
- “That was another very small reason why I didn’t play the game was just because I kind of had to study the Black Death for a really big project during my high school years, and I was really tired of the topic. Like I just didn’t want to hear about it again.”

6.7.7 The Topics that Interest Undergraduate Students

When students said that their failure to play the game was due to their disinterest in the game's Black Death topic, interviewers asked what topics would interest them. In response, they chose current events, major issues that would affect the world during their lifetimes, and topics that they had been assigned in their current classes especially ones that pertained to their chosen major. Table 6.9 enumerates students' suggestions.

Table 6.9. Topics for Future Games

Topic	Student suggestions
Current events	<p>"Maybe [if] it was like research on a current topic like 9/11, maybe something more recent, during our time, I'd be like much more influenced to play."</p> <p>"Just any topic that is more current, like current events, anything that's really current."</p> <p>"I think if you could do like the beginning of next year like with the elections coming up maybe you can do like finding dirt on all the candidates or like learn, researching them."</p> <p>"I think if you're going to go for freshmen like introducing in like orientation and stuff, you could go with topics like alcohol and drugs because you should you know [have] awareness and everything."</p>
Major issues in their lifetimes	<p>"Environmental topics like researching new ways to conserve energy."</p> <p>"I was kind of going along like maybe global warming in that sense because it's like drawing it to us everyday in the news."</p> <p>"I would choose something happier or something people are interested in. If you talked about current health issues with college kids or something that would be something I would research just because it pertains to me whereas the Black Death is probably not coming around [any time soon]."</p> <p>"As far as motivating us to the subject matter you could do, try issues that people care about like you were talking about the environment or even political issues."</p>
Current classes	<p>"If I felt like I was learning more out of it there might have been more incentive to do it. I don't think and even if it was related to school like that's what we were supposed to be doing like learning."</p> <p>"I like science so if this was related to a science paper I had to write earlier ... then that would have been great. Maybe have a paper revolve around that topic? A more general paper where it taught you how to find or do research for something that you were working on."</p> <p>"I like the theories in econ[omics] and ... the supply and demand stuff. I guess if you wanted to choose it to be about econ, the game to be about econ, and you have all these questions about things like that that are concurrent with your academic course ... It would help me out."</p> <p>"Like if you're going to have multiple game boards, you should have different subjects so for like all business people do this game and all science people do this game, even though that might be unfair because those people are experts in that field but I feel like that's the best part about the game is because you're going to be learning how to use the databases you're going to be using in real life."</p>

6.7.8 Incentives for Playing Information-Literacy Games

After game play began on November 3, the project team monitored team progress. Over the first weekend, only one team played the game. After SI 110's instructor told students he would give them an incentive to achieve a certain level of game play, more teams played the game.

Contrary to the project team's expectation, monetary prizes might not be necessary to motivate students to play this and other information-literacy games. Students want evidence that game play will advance their knowledge or academic standing, and they want rewards for game play that affect their final grade in the class in which game play is offered. The announcement of the instructor's incentive was sufficient to convince some students that playing the game would have a direct effect on their grade. These students were clear that the instructor's incentive motivated them to play the game:

- “The only reason I was [playing the game was] because there is no opportunity for extra credit in this college. That's the only reason I was doing it.”
- “For me at least the money is not the thing, I think the grade is ... so like I think if you gave anyone like a half a letter grade increase maybe weight it more into your grade that's going to make people play the game more because people care about their grade and money is not ... money is great but what I'm saying is would I rather have \$500 or would I rather have a better grade in the class? And ultimately I would rather have a better grade in my class.”
- “I know just the monetary reward didn't get my team like stirred like you weren't really doing anything. Like, yeah, it would be great to have money in our pocket but it was a lot of work to get that money, and there was a chance you weren't going to win like somebody [else] was going to come out ahead of you. But the grade, once the grade got put in, like that night we met and just started doing it just because again not because we have bad grades but just in case you get a bad grade or the paper wasn't as good or something. It helps and it's stupid not to do it.”
- “On the incentive idea ... I mean I'm a sophomore here and when the teacher says extra credit that's a big thing because in the Business School that does not happen at all, and in most of my other classes like extra credit is something that happened in high school only, and just the idea of having a little bit of insurance for doing this thing which teaches you something isn't always bad, and I don't necessarily need it or anything but knowing that I have it for some reason ... and something doesn't go right, I have that little cushion which is really nice.

Neither money nor the instructor's incentive could motivate this student:

- “When you first told me about it, it didn't sound interesting to me at all. I'm not a fan of edutainment. I feel like you should do one of the other ... I work and I have 16 credits so I don't have time to do extra things that I don't really need. The money obviously isn't much to me because \$100 I can make that in a day at work and the grade thing, I already have an A in this class.”

Checking the Leaderboard, students who did not think that they could catch up or overtake the leaders gave up or did not bother to initiate game play.

- “The money ... was only available to three teams so a lot of people would say there's no way I'm going to come in the top three so why bother?”
- “I signed up and I played twice ... I saw the leader was up like up by like how many points, like 6,000 points so I just gave up.”

During interviews, the co-PI asked students whether a one-year full-tuition scholarship would induce students to play information-literacy games like the *Defense of Hidgeon*. Students were very enthusiastic about such a prize:

- “That’s ridiculous. I would have spent hours [play]ing it.”
- “I can guarantee you my team probably would not have slept.”
- “I mean of large quantities of money, of thousands of dollars, I can’t see anybody not spending hours doing this.”
- “Seriously, like if you gave it to the whole incoming freshman class and then I would definitely play.”

A few students were circumspect about their chances of winning such desirable prizes. They told us that they would monitor the leaderboard, and, if they noticed they were way behind the leaders, they would terminate game play.

- “I think you would see people drop out half way through when you see someone else reach 30,000 points or something. I mean I would have done it if you would have said free tuition.”
- “As an incoming freshman, I still wouldn’t have played [the game] because [if there’s] only one prize for half tuition or whatever, I would weigh like my chances of me actually winning, and say well all these people are going to have so much more time than me if I’m working or there’s this and that. I mean I can’t say maybe I would have but I probably wouldn’t have just because the chance of you winning is still so low, and there’s only one prize that that comes into deciding. It’s not just in the dollars and cents, it’s also the chances.”
- “There’s so many freshmen out there and there’s just going to be this small group of freshmen that’s really going to go for the money. And then the big part of the freshmen [class] is just going to say, oh, I’m not going to try so hard because these four are going to work so much harder for this money, and the big groups are going to do it so you’re [still] not going to get all the people to do this.”

Here is a student who cites the social rewards that winners reap as being a factor in her decision to play the game.

- “The only way I can see competition working is if you’re competing for a reward and not like a monetary award like a competition between the people ... There needs to be some sort of social reward for winning. You know like basketball or sports work like a social ha, ha, I won the reward. Whereas like this game you won and it’s like okay you won.”

It is not unrealistic to consider future information-literacy games that would be sponsored by vendors in the information industry. Vendors would donate funds that could be used for prizes connected to tuition, textbooks, computer purchases, or software support and add their names to particular prizes. As a result, such desirable prizes would give the game instant credibility, induce students to play the game, and reap both monetary and social rewards for winners. The Storygame Project’s *Defense of Hidgeon* game was a modest first step at game development. Building on this initial effort could include the search for information industry sponsors whose involvement could boost student participation and recognition generally.

6.7.9 Students' Cavalier Attitude about Conducting Research

The project team was surprised that hardly any game players went to the library to check out books or edited works before answering a questions. During our discussion of their failure to visit the library, a few students assumed a cavalier attitude about whether the items in the library's physical collections should figure into their research. For them, research meant searching the web or library-supplied databases for recently-published works and downloading them to their computer's desktop.

- “I think realistically the way we do research now as college students applies much more to finding the article on a website through databases and much less through actual books. For example, I used some books for a paper last year and they were checked out in 2000. Like it had been 7 years since the book had been checked out and that's how we're kind of like shifting and I think books may be less relevant towards our needs in terms of what we actually need to know. We're kind of losing the art of finding the book and using the library in that sense but that's just the way it seems it's going.”
- “[Why bother with books when you have] the Internet ... It is kind of ... an easy out. You get all these libraries all over. There's like JSTOR, and you can go through a document, and you can search through that document using find, and you can look for all the relevant words and really quickly skim through hundreds of documents in the time it would take to get to the library especially if you live off campus or a place where the bus routes suck.”

The project team speculated that undergraduate students may be getting mixed messages from their instructors who stress the importance of searching library-supplied databases. Especially in the sciences, students hear their instructors telling them that the latest research is online or published in journals. They search these databases and retrieve articles that are a fraction of the length of major books on the same topic. Then the principle of least effort comes into play, that is, students opt for the shorter journal article over a much longer book or edited work. Eventually students come to question whether they should bother with books especially when they notice that the publication dates of books reach back to the days when these students were in junior or senior high school. For students in college, their high school days may seem a long way in the past, but they could benefit from the major monographs that detail the state-of-the-art on a particular topic or in their chosen area of inquiry.

6.7.10 More Evidence of the Principle of Least Effort

Earlier discussions about students' reluctance to leave their personal computers to travel to the U-M Libraries to fetch a book or perform a task connected with obtaining a Hospital release code cited the principle of least effort as an explanation for their lackluster behavior. In this comment, a game player confesses that he asked the librarian to answer game questions for him:

- “I used ask the librarian a lot. They answered my questions. If I had a question like if I didn't think the website was very clear on what answer I wanted to know like I would see the librarians' perspective on that database and then they would basically give you the response that you wanted like correctly — they didn't even know the game. I don't know like I just asked them a question if I had a question about and they would answer it exactly. [My questions to the librarians were] the ones that were like which database should I use for this like I would ask a librarian that.”

Here is a comment from a student who considers print publications tedious because they cannot be searched for information on specific topics.

- “It’s not that I personally have an aversion to books. I quite like books. It’s just when doing research online, it’s so much more efficient. For instance even a book that’s online like the thing that Google is trying to do and add all their books online ... you’re looking at this huge book right and you want to [find] a specific topic, you can search specific words or series of words and find it in a book. And also if you’re going to be using online resources, it’s easier to use one type of resource, either on paper or in books, or online. So to go between [paper and online,] I think it’s going to get tedious. And that’s what my personal aversion is to it.”

Another student feels inconvenienced by a 15-minute detour to the library:

- “Personally I think getting college kids to travel to the library is difficult. I know the only times that my group went to the library to get the codes like you send an email like, oh, we’re in the hospital again like we would get the codes when it was almost convenient for us like when we were studying in the library or something but to go and check out books it’s time consuming, and I know we’re college kids, we’ve got a lot of time but we’re also strapped for time sometimes so I felt like for us to actually leave and go get the books ... I find it hard to fit into my schedule. It always comes up like 15 minutes to run to the library to get a code or something like that. I just felt like going to the library was really taxing on my schedule.”

6.8 Section 6 Summary

Section 6 features the results of the Storygame Project’s analysis of game play data. The InfoHunters team was the game’s first place winner (Table 6.1), earning 18 scrolls before most teams signed onto the game for the first time and owning exclusive licenses to monastery libraries from the beginning to end of the game. Of the 13 teams that signed up to play the *Defense of Hidgeon*, 6 teams met the instructor’s incentive, 1 team tried but failed to meet the incentive, 4 teams signed onto the game and answered 1 to 12 questions, and 2 teams failed to sign onto the game (Table 6.1). Subsequent sections consider teams that met the instructor’s incentive as “successful teams,” and the remaining teams as “unsuccessful teams.”

Section 6.2 characterizes 5 game-play patterns: (1) instant starters, (2) dropouts, (3) testing the waters, (4) pre-Thanksgiving dashers, and (5) last-minute rushers. Unsuccessful teams played in patterns 2, 3, or 4, and successful teams played in patterns 1, 3, 4, and 5. Section 6.3 is a play-by-play description of team play from the game’s beginning on November 3 to its ending on November 29. The InfoHunters led the game every day except for November 25 when they failed to respond to a challenge from Maize team within the 4-day deadline. The InfoHunters regained the lead almost immediately after the Heroes lost 1 of their 17 monastery libraries to a challenge by the Warriors team.

Overall, unsuccessful teams answered 35.7% of questions correctly (Table 6.3). At first, the game’s unsuccessful teams appeared to be testing the waters, that is, trying to determine whether they should invest time and effort in game playing (section 6.4). Six became dropouts. Only the Warriors team demonstrated serious game play activity — answering questions at an accuracy rate somewhat higher than by chance, purchasing exclusive licenses, and challenging opponents. Most likely, the Warriors had every intention of meeting the instructor’s incentive but a combination of competing priorities and technical problems that suspended game play during Thanksgiving break prevented them from doing so.

Six successful teams played the game (section 6.5). Overall, successful teams answered 50.9% of monastery library, 52.7% of Sage Advice, and 64.5% of Library Study questions correctly (Tables 6.4 and 6.7). Successful teams fared better with web, encyclopedia, and journal-article database questions because they could do the research *online* at their personal computers (section 6.5.2). Game players confessed that they did not visit the U-M Library’s reserves collection to borrow books and edited works and examine them for answers to questions (sections 6.5.3 and 6.7.10). In fact, successful teams were less likely to answer

monastery library questions correctly when they had to examine any item — a web page, encyclopedia article, book (figure 6.4). The project team speculated that undergraduate students' lack of familiarity with citation database searching and the complicated nature of the game's citation database questions contributed to their especially low accuracy rates for citation database questions (section 6.5.3). Also difficult were questions with multiple answers (section 6.5.5 and figure 6.6). Section 6.5.7 examined particularly difficult questions, that is, questions that several teams answered incorrectly more than once.

Because the InfoHunters and Heroes owned most exclusive licenses, all challenges involved one of these two teams (section 6.5.8). Only 1 of 13 challenges was a complete challenge in which both challenger and owning team submitted bibliography entries to the game. The other 12 challenges were incomplete with either challenger or owning team or both failing to submit bibliography entries within the 4-day deadline. A redesign of the *Defense of Hidgeon* would have to include automatic email notification to challengers and opponents to make both aware of a pending challenge.

Despite the project team's best intentions, the Hospital was a real show-stopper (section 6.6.1). Game players resented leaving their personal computers to go a U-M Library to complete the task. They recognized that Hospital tasks gave them opportunities to learn about library services; however, their goodwill about the Hospital turned sour when a stay in the Hospital brought their game play rhythm to a sudden halt. A redesign of the Hospital would put an upper limit on the requirement for teams to perform Hospital tasks.

Students played the game in teams and individually (section 6.6.3). Some teams gathered as a group to play the game on their personal computers, for example, one player interacting with the game and his or her three teammates connected to online sources finding answers to questions. Unfortunately, their game play was usually spoiled by Hospital stays that required them to visit distant campus libraries to gain their release. Other teams relied on individual game play in which one player accomplished as much as he or she could, handing game play to a teammate for a while. To do the legwork connected with the Hospital or make decisions pertaining to a challenge, players used electronic mail, Facebook, or cell phones to contact one another (section 6.6.4).

Game players would have benefited from feedback that told why their answers to questions were incorrect (section 6.6.2). Adding versatility to gold, the game's currency, would figure into the redesign of the game (section 6.6.6). Students identified new and different genres for future information literacy games (section 6.6.6). A solution to the multiple board problem may be extended game play with several boards in which board winners and, possibly, runners-up, continue game play on fewer boards until game play concludes on 1 final board (section 6.6.5). Alternatively, the *Defense of Hidgeon* could be redesigned making it possible for teams to jump from board to board seeking new opportunities when few exist on their original board.

Section 6 concludes with a discussion of what game players learned about library research as a result of playing the game (section 6.7). Students cited these benefits of game play (section 6.7.2): (1) learning how to use the tools of research, (2) doing research tasks connected with various online tools over and over again, and (3) confronting and solving important problems during the research process. They did not explicitly say that the game taught them how to think about what they were doing or give them opportunities to do so (section 6.7.3). Upperclassman especially said that they learned little from game play because they already knew about research and online searching (section 6.7.1). Instead of playing the game, some students preferred to be told directly what they would learn from playing the game. Given the option between traditional approaches to learning information literacy skills and concepts, students were divided between traditional approaches and games (section 6.7.4.).

The majority of students who did not play the game felt that they could not fit game play into their busy schedules (section 6.7.6). Some signed onto the game, played for a while, and realized they would not be

able to devote much time to game play, and others encountered something about game play that they did not like. Students' suggestions for topics for future information literacy games cited current events, major issues that would affect the world during their lifetimes, and topics that they had been assigned in their current classes especially ones that pertained to their chosen major (section 6.7.7 and Table 6.9).

Contrary to the project team's expectation, monetary prizes might not be necessary to motivate students to play the *Defense of Hidgeon* and other information-literacy games (section 6.7.8). Students wanted evidence that game play would advance their knowledge or academic standing, and they wanted rewards for game play that affected their final grade in the class in which game play was offered.

7 PROSPECTS FOR INFORMATION LITERACY GAMES

Based on an analysis of game play and evaluation data, the Storygame Project team generated 8 premises for the development of information literacy games (section 7.1). Sections 7.2 to 7.9 describe each premise and tell how the project team would improve the *Defense of Hidgeon* and design a new game to be in sync with each premise. The report concludes with section 7.10 that describes our final development of the *Defense of Hidgeon* so that it is conducive for test drives or game play using the game's existing database of Black Death questions and answers that are based on the U-M's library collection.

7.1 Eight Premises for the Development of Information Literacy Games

Based on our evaluation of game play, we arrived at these eight premises about educational games, which should guide the development of the *Defense of Hidgeon* and information literacy games generally:

1. Game play must contribute in a useful way to the coursework students are already doing.
2. Game play that gives players mastery over one key concept, task, or procedure is preferable to comprehensive game play.
3. Game play must count toward students' grades in the course.
4. Game play must give students opportunities to see other researchers at work so they can connect what they do to what others do.
5. Students want positive and negative feedback from games to improve their performance.
6. Although students want to be in control during game play, they will collaborate with their peers when the collaboration furthers what they want to accomplish.
7. Students must have concrete evidence that leaving their computer to do research will have a payoff in terms of improving their research or affecting their grades.
8. Game play must foster opportunities for students to reflect on their own research habits and what they are learning.

7.2 Game Play that Contributes in a Useful Way to Coursework

Game play must contribute in a useful way to the coursework students are already doing. Although project findings generally support this premise, here are findings that specifically support this premise:

- When SI 110 students were slow to sign up on teams and play the game, the instructor had to issue an incentive to encourage signup and game play (sections 4.2 and 6.7.8).
- Students told project team members that they did not play the game because it was not relevant to SI 110 coursework (sections 6.7.1 and 6.7.6).

The Storygame Project team situated game play in Professor Robert L. Frost's "Introduction to Information Studies" course because it was easy and convenient. His course is our School's only undergraduate offering, and Frost was eager to find out what benefits his students experienced from game play. SI 110 provides students with a foundation for understanding information revolution issues and ideas that are theoretical (e.g., what is information and how do humans construct it), cultural (e.g., comparing the distance-shrinking and knowledge-building technologies such as telephones, televisions, and the Internet), and practical (e.g., what are the basic architectures of computing and networks). Although learning about the

GenSpec Model by playing the *Defense of Hidgeon* was tangential to course content, it would give SI 110 students relevant skills and knowledge for researching the two 5-page papers that they were required to write. In particular, it would help them select among the hundreds of databases now available to U-M students, give them familiarity with certain databases, and increase their mindfulness about evaluating retrieved information especially with regard to its authoritativeness and credibility. Also, it would build on the introduction to library resources and online searching demonstration that a U-M librarian gave to SI 110 students prior to game play.

To be in sync with premise #1, the project team would have to situate the *Defense of Hidgeon* in learning situations that are devoted to information literacy skills and concepts. Most likely, this would be a class, workshop, or tutorial offered by a college or university library in which students enrolled knowing that they would be learning about library research and finding information. Instead of the *Defense of Hidgeon's* focus on the Black Death, a comparable game that enlists *Hidgeon's* genre and architecture would embrace topics that interest undergraduate students such as current events, major issues that are likely to affect the world throughout during lifetimes, and topics that they had been assigned in their current classes especially ones that pertained to their chosen major (see section 6.7.7 and Table 6.9).

Based on our experience with game play and evaluation, we would be much more ambitious in a follow-up to the *Defense of Hidgeon*. In the future, we would offer undergraduate students information literacy games that are a pervasive and unobtrusive presence beside the online tools and collections they use to research, write and document a writing assignment. Such a game would involve search engines, library portals, link servers, discipline-specific databases, library catalogs, citation managers, and online library collections. Let us keep this idea in mind as we proceed from premise to premise in the sections that follow.

7.3 Game Play Giving Players Mastery Over One Key Concept at a Time

Game play that gives players mastery over one key concept, task, or procedure is preferable to comprehensive game play. Here are findings that specifically support this premise:

- Hardly any game players realized the GenSpec Model from game play (section 6.7.3).
- Instead of realizing the GenSpec Model, players focused on the related information literacy concepts that they learned from game play (section 6.7.2).

The Storygame Project team's original conception of the *Defense of Hidgeon* was quite simple — feature game play that reveals the GenSpec Model for starting one's research, building on a good start, and evaluating what one finds (see section 3.2 and appendix A). During game design, development, and demonstration, the project team added functionality to the game that added to its complexity making it difficult for players to realize what the game was teaching them. For example, we added non-monastery library spaces to the game such as Library Study spaces that gave game players opportunities to familiarize themselves with the important functionality of certain search engines and the Hospital space that introduced players to the U-M's many campus libraries and librarians. We also added the challenge, a feature that increased the game's interactivity and made game players confront issues such as credibility, disciplinary, and granularity in the course of choosing sources for the competition.

If we were to redesign *Hidgeon*, we would streamline the game, possibly eliminating Library Study and Hospital game spaces and reducing the number of Sage Advice spaces. We would also rethink the challenge. It could be simplified requiring teams to post their 1 best citation. It could also be redesigned so that the game automatically chooses the best citation from a team's bibliography in view of the various attributes of the challenge scenario. Players could study the game's best citation to choose a second-best citation from their team's bibliography. Alternatively, the challenge could be eliminated entirely and

replaced by a “Synthesis” game space immediately preceding the Castle of the Duke. Landing on this game space, players would give answers to questions that specifically asked them to make observations about the game that would reveal the GenSpec Model to them.

Let us consider a new information literacy game that is a pervasive and unobtrusive presence beside the online tools and collections students use to research, write and document a writing assignment. The new game would be a passive but pervasive presence, one game made out of a collection of many narrowly-focused mini-games, sensing active players and challenging them to play various mini-games based on student contributions to a shared bibliography on an instructor-assigned topic in an online citation manager. For example, a credibility mini-game would extract a citation from the shared bibliography, present it to two active players, and give them a limited amount of time to rate the citation according to its credibility. The game would calculate the closeness of their respective ratings and award players points based on the closeness of their respective ratings. If one person is playing, the player’s rating would be compared to a domain expert’s credibility rating. Feedback would be immediate, that is, the game would report immediately to players how closely they matched the rating of their peers or of a domain expert so that players could make adjustments in the future to effect better ratings. Occasionally, the game could ask players questions about why they should be concerned with credibility and provide feedback to players who give incorrect answers to such questions.

7.4 Game Play that Counts toward Students’ Grades in the Course

Game play must count toward students’ grades in the course. Here are findings that specifically support this premise:

- When SI 110 students were slow to sign up on teams and play the game, the instructor had to issue an incentive to encourage signup and game play (sections 4.2 and 6.7.8)
- Three of the game’s 6 successful teams played at a low level using the game’s basic functionality that was sufficient for meeting the instructor’s incentive (sections 6.2, 6.3, 6.5.1, and 6.5.8).

The evidence in favor of this premise was overwhelming. Initially, 29 students of SI 110’s 75 students signed up on 8 teams to play the game (section 4.2). Only 1 team began game play immediately after the game’s start. To spark students’ interest in game play, the instructor gave an extra-credit incentive to his students. In response, 20 more students signed up. Overall, 49 (65%) of the 75 students in the class signed up on 13 teams to play the game. Of the 13 teams, 6 teams (23 students) successfully achieved the instructor’s incentive (Table 6.1). With a few exceptions, successful teams paid little attention to game features beyond the basics that enabled them to meet the instructor’s extra-credit incentive. Such game play indicates that these teams were playing for extra credit, not to learn about information literacy concepts.

At many colleges and universities, learning situations that are devoted to information literacy skills and concepts are credit-free classes, workshops, or tutorials, and many are one-time events. It would be difficult to require game play in these situations. Academic institutions that require students to learn information literacy skills and concepts during fall orientation, mandatory English seminars, or first-year experience programs could incorporate game play into the curriculum and grade players based on their standing on the final leaderboard, accuracy rate, and success with the game’s challenge functionality.

The design of a new information literacy game that is a pervasive and unobtrusive presence beside the online tools and collections students use to research, write and document a writing assignment would have to include reporting functions so that instructors could grade students based on how frequently they play mini-games, how their performance compares to the performance of their peers, and whether their performance improves as they learn from expert ratings. Instructors should inform students in advance

what game-play activity they are grading and why such activity is important. Such information would undoubtedly lead to a discussion about what students should learn from the game.

Let's consider grading a tagging mini-game that students play on their own. In advance of game play, the mini-game would extract keywords from the citations game players add to shared bibliographies on topics. During game play, the mini-game presents a citation to a player, asks the player to contribute relevant keywords in a limited amount of time, and compares player-supplied keywords with database-assigned keywords. The game would reward players by adding to their overall score when they match the keywords that database suppliers add to citations. The objective of such a game would be to demonstrate to students that the keywords databases assign to citations are the same ones students must use to conduct successful database searches. Instructors should be impressed with students whose performance matching database-supplied keywords improves over the course of game play and reward them accordingly with good grades.

7.5 Game Play In Which Students See Other Researchers at Work

Game play must give students opportunities to see other researchers at work so they can connect what they do to what others do. The *Defense of Hidgeon* was limited in this regard. To some degree, the game's challenge functionality introduced players to concepts such as discipline, audience level, and credibility, but few teams challenged their opponents, and when they did, teams did not complete challenges.

The design of a new information literacy game that is a pervasive and unobtrusive presence beside the online tools and collections students use to research, write and document a writing assignment would have opportunities for game players to observe their peers, domain experts like their instructors and academic advisors, and database experts who build scholarly and scientific databases. For example, let us consider a credibility mini-game that extracts a citation from a shared bibliography, displays it to a player, and asks the player to rate the citation according to its credibility. To score the game, the player's rating would be compared to a fellow student's or a domain expert's credibility rating. Immediate feedback could be provided that rewards players by increasing or decreasing their overall score based on how closely they match ratings of peers or domain experts. Instructors should do in-game updates or post-game debriefing that compares overall student scores with peer and domain-expert ratings and articulates reasons for differences between the two.

A tagging mini-game would enable students to compare the tags they assign to citations and the keywords database suppliers assign to them. This mini-game would extract the citations that game players add to shared bibliographies, present a citation to two active players, ask the players to contribute relevant keywords in a limited amount of time, and compare the extent of match between the two players. If one person is playing, the player's keywords would be compared to database-assigned keywords. The game would reward players who match the keywords that their peers or database suppliers assign to citations. Immediate feedback that awards players points based on the extent of match would enable players to assess their performance in mini-games with their peers and with database experts and compare the two. Instructors who do in-game updates or post-game debriefing should articulate the reasons for differences between the scores for peer versus database-expert tagging so that players develop realizations pertaining to keywords that improve their success with conducting online searches.

7.6 Games That Give Players Feedback to Improve Their Performance

Students want positive and negative feedback from games to improve their performance. Here are findings that specifically support this premise:

- Game players were dismayed that the game gave them no feedback telling them the reasons why their answers to questions were incorrect (section 6.6.2).

The Storygame Project team's decision to give game players feedback for their correct answers and omit it for their incorrect answers was ill-advised. In interviews, game players told us they would have been receptive to feedback after submitting an incorrect answer because they wanted to know why their answers were incorrect. Game players who studied feedback might have learned something new that they could have used to answer subsequent questions or to apply to future information-seeking episodes.

Switching feedback from *Hidgeon's* correct to incorrect answer messages would require a significant development effort at this time. Thus, we acknowledge our mistake and hope others learn from it.

Feedback would be an integral part of a new information literacy game that is a pervasive and unobtrusive presence beside the online tools and collections students use to research, write and document a writing assignment. A relevance rating mini-game that presents citations to two players simultaneously and asks them to rate their relevance vis-à-vis bibliography topics would give players immediate feedback with regard to each player's ratings. This mini-game would also follow up reporting to these players relevance ratings from all players to date so that they would know how their ratings fare vis-à-vis their classmates generally. If one student is playing the relevance mini-game, she or he would be asked to match the relevance assessments that a domain expert gives to citations. In addition to feedback that tells how closely the player matched the domain expert's rating, the mini-game could display the expert's reasons for the ratings, not necessarily in the form of open-ended written statements that are unique to each citation but in the form of checkmarks alongside a standard list of relevance criteria that domain experts typically consider important. Instructors who discuss game play during class could ask students why there might be differences between ratings of peers and domain experts and what the consequences of such differences means with respect to conducting research, synthesizing what they read, and reporting it in their papers.

7.7 Games That Put Players in Control

Although students want to be in control during game play, they will collaborate with their peers when the collaboration furthers what they want to accomplish. Here are findings that specifically support this premise:

- SI 110 students were slow to sign up for teams to play the *Defense of Hidgeon*, some taking as long as 10 days to sign up (section 4).
- Despite the project team's recommendations that students play in teams, some students preferred to play the *Defense of Hidgeon* on their own (section 6.6.3).

A significant development effort would be necessary to enhance the *Defense of Hidgeon* for team play in which team members interacted online at the same time. Most likely we would build a capability for the controlling player to pass control to a fellow team member. While such a capability would have been desirable for the *Defense of Hidgeon*, it was not possible within our time and budget constraints. Should others want to improve *Hidgeon* or build comparable web-based board games, including a capability for players to pass control to fellow teammates should be a top priority in their development efforts.

Future information literacy games should put players into situations that further their own research and, at the same time, leverage individual efforts for the benefit of all game players. Let's consider the task of building bibliographies on a particular topic. A game player would add citations and online full texts to a shared citation manager that includes the relevance assessments, credibility ratings, tags, and audience-level designations that game players add during mini-game play.

One can envision a mini-game that presents citations to two game players and challenges them to rate them using the 5 audience level designations we used in the *Defense of Hidgeon*, i.e., from 4th grade up, from 9th grade up, from college up, from college majors up, and scholars and scientists talking primarily

to their peers. When the players finish rating citations, the game gives the players feedback telling how closely they match each other's ratings and uses their audience-level ratings to compute an average rating for each citation. When players are ready to write their papers on a particular topic, they search the citation-manager database, limiting retrieved citations to audience-level ratings that match their experience and knowledge of the topic. Given their experience playing the audience-level mini-game, students are likely to have an instant realization of how limiting their searches using audience-level designations will affect the results. Mini-games could be enlisted to transform other aspects of bibliography-building into collaborative activities so that the results of these activities would benefit all students who would eventually use the citation-manager database to choose citations for their papers.

7.8 A Payoff for Leaving the Computer Behind

Students must have concrete evidence that leaving their computer to do research will have a payoff in terms of improving their research or affecting their grades. Here are Storygame Project findings that specifically support this premise:

- Going to the library was disruptive. Students wanted game play that is entirely online. They considered any deviation from an online administration as bothersome. (Section 6.5.3)
- Although students recognized that Hospital tasks gave them opportunities to learn about library services, their goodwill about the Hospital turned sour when landing in the Hospital occurred repeatedly (section 6.6.1).
- Some students assumed a cavalier attitude about whether the items in the library's physical collections should figure into their research (section 6.7.9)

Putting an upper limit on the requirement for teams to perform Hospital tasks would remedy the ill-will that game players developed toward the *Defense of Hidgeon's* Hospital feature. Because *Hidgeon* teaches game players about the GenSpec Model that includes books and edited works that are found in the library's physical collections, it would be difficult to conceive of this game without including books and edited works that require players to go to the library. Perhaps enhancing *Hidgeon's* interface so that passing control between players would make the task of visiting libraries less burdensome for them. However, convincing game players that the books and edited works in a library's physical collections are still relevant now that so many other items are online will not be an easy task.

If the design of a new information literacy game that is a pervasive and unobtrusive presence beside the online tools and collections students use to research, write and document a writing assignment involves bibliography-building, it is conceivable that students will exhaust the web and online databases searching for citations and online texts on particular topics and eventually give into searching the Mirlyn online catalog that retrieves items in physical collections. To encourage players to contribute citations to books and edited works, mini-games could be programmed to award bonuses to players who contribute items that come from the library's physical collection. Playing mini-games that require them to analyze citations with regard to audience level and credibility, players might realize gaps that make it difficult for them to scaffold from the less credible information on the web to the more technical and scholarly information in online journals. This is a gap that books can fill because books synthesize human knowledge about particular phenomena in and across disciplines, they span large intellectual spaces, tackle mammoth problems, make more intensive cases than all other literary genres, and undergo rigorous editorial review. Because game players may need help coming to such realizations on their own, let us next consider how games can foster opportunities for students to reflect on their own research habits and what they are learning.

7.9 Game Play That Fosters Opportunities for Reflection

Game play must foster opportunities for students to reflect on their own research habits and what they are learning. Here are findings that specifically support this premise:

- Some teams engaged in game play at a minimum level that was focused exclusively on meeting the instructor's incentive for extra credit (sections 6.3, 6.5.1, and 6.5.8).
- Asked about what they learned as a result of playing the *Defense of Hidgeon*, most players focused on the very concrete task of learning how to use the tools of research (section 6.7.2)
- Students did not explicitly say that the game taught them how to think about what they were doing or give them opportunities to do so nor did game players realize the GenSpec Model from the experience of game play (section 6.7.3).

To assess the potential of game-playing in college classrooms, the Storygame Project team was low-key about incorporating the game into the SI 110's curriculum. Our inclination was to downplay the game preferring instead to gauge student enthusiasm on the game itself, not on a special buildup. As a result, we learned that game play cannot take place as an adjunct or extra-credit exercise, it must be an integral component of the curriculum. In the future, we would advise educators who want to incorporate *Hidgeon* game play into their curriculum to cite game play in the syllabus and devote time for in-class discussion before, during, and after game play. Despite our efforts to include questions that would encourage game players to think about why *Hidgeon* was structured in a particular way, most players were intent on meeting the instructor's incentive, not on thinking about what they were learning. Had we designed the game with feedback for incorrect answers, perhaps players would have been more likely to think about what the game was teaching them.

We have called for information literacy games that are a pervasive and unobtrusive presence beside the online tools and collections students use to research, write and document a writing assignment. The game could question players at random asking them questions about what they are learning from game play, and giving them feedback for both correct and incorrect answers.

Information literacy games cannot stand on their own. Added to game play must be in-class discussion before, during, and after the game that encourages students to think about what they are learning. In fact, students should think about how their ideas about conducting research change at major milestones such as the beginning, middle, and end of game play. Instructors should also generate reports from the game's reporting function so that they have evidence in hand that they can share with students to emphasize important ideas.

7.10 Final Development of the *Defense of Hidgeon*

This section describes the final development effort of the Storygame Project team that makes it possible for anyone to test drive the *Defense of Hidgeon* or administer a game using *Hidgeon's* existing database of Black Death questions and answers that are based on the U-M's library collection.

7.10.1 Migrating the *Defense of Hidgeon* to a Professional Web Hosting Server

The Storygame Project team has moved the *Defense of Hidgeon* to a professional web hosting server to minimize technical problems that are characteristic of servers at academic institutions. Professional web hosting also enables us to enhance the game's challenge functionality with automatic email notification of pending challenges.

7.10.2 Game Administrators: Creating a New Account and Game Board

You are invited to serve as a game administrator and host game play between teams or individuals or a combination of the two. If you want to serve as a game administrator, navigate to the game at http://storygameproject.org/team/new_account_and_board/ and create a new user account and game board. Under “User Account Details,” the form asks you to give your account a name (User Name), set your password (User Password), confirm your password (Confirm password), and choose a game piece (Game Piece). Under “Board Details,” the form asks you to choose between a “Private” or “Public” game. If you choose a Private game, the form will prompt you to enter a Board Access Code. Enter a Board Access Code of your choosing into the form and give your Board Access Code to the people who will be playing with you. If you choose a Public game, anyone can join your game.

Please be advised that your Private game’s Board Access Code is case sensitive. For example, the Board Access Code “ABCD” is different from the code “abcd” because the former is in upper case and the latter is in lower case letters.

When an administrator creates a new account, the form asks you to set the amount of time that your Private or Public game will last (i.e., one, two, three, or four weeks). The game board will expire after your selected time period (i.e., one, two, three, or four weeks). After that time, game players will be able to access their accounts to check the Leaderboard only.

If an administrator wants to play with a select group of friends, it is best for this administrator to create a Private board and set a Board Access Code, preventing users without this code from joining their board. The administrator is then responsible for telling her friends their game’s Board Name and Board Access Code. When friends sign onto the game to play on their administrator’s game board, they will have to first sign up for a game account (see section 7.10.3).

If the administrator sets up a Public game, anyone is able to join the game from the Internet, whether the administrator knows them or not. It is best to play a Public game when an administrator cannot identify enough friends for a Private game or when the administrator does not care who is playing on their game board.

Whether administrators are playing a Private or Public game, the form asks them to set the amount of time that their Private or Public game will last, i.e., one, two, three, or four weeks. The game board will expire after the selected time period, i.e., one, two, three, or four weeks. After that time, game players will be able to access their accounts to check the Leaderboard only..

7.10.3 Join an Existing Game as a Player or Team

To join an existing game as a player or team, navigate to http://storygameproject.org/team/new_account/ to create a new user account. Under “Create User Account,” the form asks you to give your account a name (Name), set your password (User Password), confirm your password (Confirm Password), and enter an email address that the game uses to notify you of challenges (Email). For “Game Type,” choose Public or Private. If you select Public, pull down the “Available Games” dropdown menu and choose the Public game board you want to join. Public game boards listed on this menu are dynamic and represent games that are currently active. If there are no Public game boards available, the pulldown menu will say “No Public Game Boards Available.”

It is best for users to join a Private game so that they can play with a select group of people. Designate one player to be an administrator and set up a Private game in advance (see section 7.10.2). Ask your administrator for your Private game’s Board Access Code and Board Name. When signing up for an

account, choose “Private” under “Game Type,” mouse down on the “Available Games” dropdown menu and choose the Board Name that your administrator gives you, and enter its “Board Access Code.” (Board Access Codes are case sensitive, for example, the Board Access Code “xyz” is different from the code “XyZ” because the former is in lower case and the latter is in both upper and lower case letters.)

The final sign-up step pertains to all players whether they sign up for a Private or Public game. Choose a game piece from the “Game Piece” dropdown menu and click on the “Create Account” button. Please note that your user account is specific to a Game Board, thus, for each Game Board you join, you must create a new user account.

7.10.4 Playing the Defense of Hidgeon

To join an existing game, navigate to <http://storygameproject.org/team/login/>, log into the game using your Name and Password, and play the game. The *Defense of Hidgeon*’s question-and-answer database is based on the physical and online collections of the University of Michigan Library. Graphics, backstory, game space scenarios, and game pieces also reflect the game’s Black Death theme. When your account’s selected time period ends, the game ends and retires game pieces automatically. You can still sign onto your account to review the Leaderboard and determine winners and losers.

7.10.5 Differences between the Original and Final *Defense of Hidgeon*

In the final *Defense of Hidgeon*, game pieces landing on the Fox Hunt are sent to the Hospital. Clicking on their game piece, players read the message, “Good news! The doctor is in! This allows you to exit the Hospital for free!” Thus, instead of receiving a Hospital task, game players continue playing by rolling the die and leaving the Hospital.

In the final *Defense of Hidgeon*, the game notifies teams via email of a pending challenge.

The game automatically emails the PI with reports of game play activity. This enables the PI to learn about ongoing game play without having to sign onto the game every day.

7.10.6 Contacting the Storygame Project Team

Please send your questions, concerns, or observations about playing the *Defense of Hidgeon* or about the project generally to Storygame Project’s principal investigator, Karen Markey, at karen.markey@umich.edu.

7.11 Section 7 Summary

As a result of the Storygame Project team’s analysis of game play and evaluation data, the project team generated 8 premises for the development of information literacy games (section 7.1). Sections 7.2 to 7.9 analyze each premise, enumerate specific findings that support the premise, and tell how the project team would improve the *Defense of Hidgeon* and design a new information literacy game to be in sync with each premise. The report concludes with section 7.10 that describes the project team’s final development efforts to make the *Defense of Hidgeon* conducive for test drives and for game play using its existing database of Black Death questions and answers that are based on the U-M’s library collection.

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APPENDIX A. ORIGINAL GAME VISION STATEMENT

LIBRARY RESEARCH: THE ELECTRONIC BOARD GAME

March 11, 2007

Game objectives:

1. Avoid intellectual bankruptcy, that is, having in hand no “passing grades” and no “enrollment cards.”
2. Answer correctly two questions for each of the six source types: (1) web, (2) encyclopedias, (3) books in MIRLYN, (4) journal articles in general subject databases, (5) journal articles in specialized subject databases, and (6) Web of Science.

Game play:

1. Source-type landing spots are the most desired spots on the board. When a team’s marker lands on a source-type landing spot, the game allows teams to earn a “passing grade” for this source type. If the team has no “passing grades” for this source, they must correctly answer a question from this source type to earn a passing grade. For example, a team at the beginning of the game has no passing grades so it must answer correctly this simple question for the web, “What areas of Europe were spared the 14-century outbreak of the bubonic plague?” The team chooses one of three listed web pages: (1) an entry from Wikipedia entitled “The Black Death,” (2) an essay that appears to be written by a professor for his class at Boise State, and (3) Insecta-Inspecta’s examination of the Black Death. Teams are awarded a “passing grade” for a correct answer. Teams are not rewarded for incorrect answers.
2. If a team has a “passing grade” for the source type they land on, they can give the registrar one or more “enrollment cards” and, thus, purchase a question for the next higher-end source type. Source types should have different prices: (1) web=1 card, (2) encyclopedias=2 cards, (3) books in MIRLYN=3 cards, (4) journal articles in general subject databases=4 cards, (5) journal articles in specialized subject databases=5 cards, and (6) Web of Science=6 cards.
3. Teams must earn “passing grades” in order. They cannot earn “passing grades” for the web then skip to the Web of Science.
4. Instead of searching for and scanning cited items, some teams will probably guess at answers. We could put their responses on a timer, that is, not accept an answer until the passage of N minutes or M hours.
5. The game penalizes teams for non-play. If players take longer than K hours, they lose their turn and the next team is invited to play.

Game board:

1. After the team leaves “Start” are landing spots for low-end sources like the web and encyclopedias. When the player approaches “Start” are landing spots for high-end sources like Specialized Databases and Web of Science.
2. Four corners of the board:
 - Start. Passing “Start” means that the registrar deals one “enrollment card” to the team.
 - Free. Landing on “Free” means just that, it’s free to land here (or we could make landing here

a little sweeter by putting all the stuff teams had been forced to give back, i.e., passing grades and enrollment cards, into a “pot” that the next team could win upon landing on “Free.”

- Bonus question. Landing here means that team gets a question for the next logical source, for example, if the team holds 2 passing grades for “web,” 2 passing grades for “encyclopedias,” and 1 passing grade for “MIRLYN,” then the team gets a question for which a correct answer will earn them the second passing grade for “MIRLYN.”
 - Guilty of plagiarism. Landing here means the team forfeits its highest passing grade, using the last example, they’d lose the one passing grade for “MIRLYN.”
3. Spaces with negative or positive consequences. The effect of landing on these spaces could be good, e.g., “Draw one enrollment card for helping a professor research next year’s course readings,” or bad, e.g., “Because you turned in an assignment late, return to “Start” without collecting an enrollment card.”
 4. Spaces with currency or asset consequences. We could label these “Spring break,” “MLK Day,” “Homecoming,” “Rose Bowl,” and “Drop-add deadline,” and handle them creatively, for example, “MLK Day: Class is rescheduled, exchange places with a team of your choice,” or “Spring break: Advance to “Free” and collect the “pot.”

Game set up:

1. Teams choose between colored, differently-shaped markers. There is one marker per team.
2. Before the game starts, it deals each team 10 enrollment cards. Enrollment cards enable teams to override the source type of the marker they land on in the course of earning “passing grades.” (We might want to make these cards worth different amounts or tie them to a particular source type. Right now, let’s just go with the idea of these enrollment cards which are the game’s currency.)
3. The board is delivered electronically. Team status is tracked electronically: number of passing grades, source types of passing grades, and enrollment cards.
4. Instead of dice, we could feature a random-number generator between 1 and 6 or 1 and 12.
5. If a team’s marker lands on a landing spot inhabited by another team’s marker, the landing team requires the residing team to give them a “passing grade” card of their choice. The residing team is sent to “Go” and does not collect an “enrollment card.”

Rounds of play:

1. Maybe 16 teams with 2 to 3 players per team. Teams play until one winner is determined, that is, a team that has “passing grades” for all 6 GenSpec sources. Choose 3 runners-up that have progressed the farthest in terms of “passing grades.”
- 2a. A championship round determines the final winner.
- 2b. Or, alternatively, the winner and 3 runners-up are invited to bet their “passing grades” on their answer to this question: Who understands best why sources types are sequenced one to six from the web to the Web of Science?

Game benefits:

1. The PIs, instructor, or a librarians does *not* have to lecture teams and players on the GenSpec

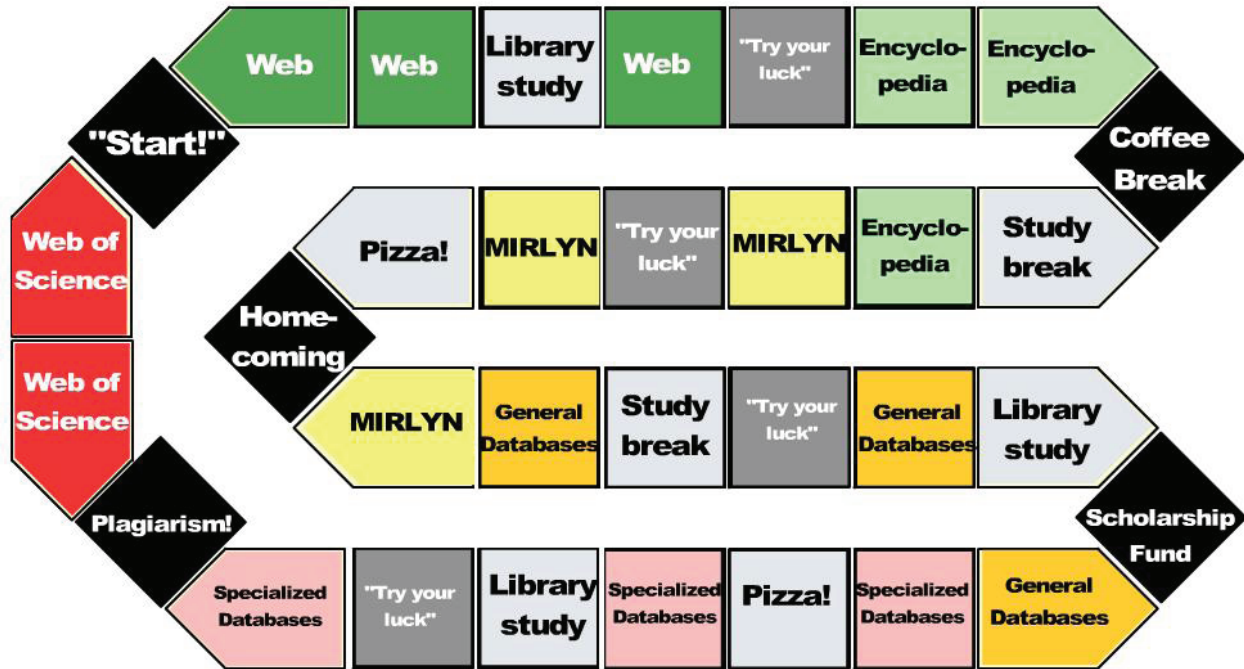
Model. It's in the game.

2. This game has plenty of chance.
3. The game will not give teams links to sources outright, we'll require them to learn how to find summaries and full-length versions of sources by giving them clues that they can use to search for full-length documents or summaries using databases through the U-M Library's Gateway, Google, or Amazon. Players must inspect the texts of cited documents. In some cases they could shortcut, reading and extrapolating from summaries. If we expect guessing, let's penalize teams one "passing grade" for three wrong answers in a row. My guess is they'll stop because they won't want to lose their hard-won "passing grades."
4. Although building a database of questions and answers will be difficult, our task is less difficult than anticipating the universe of sources because the game requires players to pick 1 of 3 sources. We can try to generate less concrete questions and more diffuse answers for high-end sources like Specialized Databases and Web of Science so that the game invites team players to observe differences in the types of sources and how they answer questions.

APPENDIX B. ORIGINAL GAME BOARD

Library Research: The Electronic Board Game

Board (draft)



APPENDIX C. HOSPITAL TASKS

Landing on the Fox Hunt space puts teams in the Hospital space where they must remain until they complete a task that demonstrates their fitness to continue researching. Game players had to visit U-M libraries to complete tasks and to collect a pass code that they typed into the game to earn their release from the Hospital. The game chose randomly from the list of 19 different Hospital tasks below.

1. Go to the reference desk at any discipline-specific library, e.g., Music, Science, Fine Arts, Public Health. Ask the reference librarian what they do differently from the Hatcher Graduate and Shapiro Undergraduate Libraries and how their collection deviates from Hatcher and Shapiro.
2. Go to any campus library and ask the reference librarian to show you how to find and use a unique library resource in their library's collection that pertains to the Black Death.
3. Go to any campus library and ask the reference librarian to answer a question from your other studies, coursework, or personal interests that has you stumped.
4. Go to any campus library, show the reference librarian your favorite web site on a topic of interest, and ask the librarian to show you how he or she can find you a library resource that is related to and builds on the web site's information.
5. Go to any campus library, introduce yourself to the reference librarian, tell her what interests you (personal or academic interests), and ask her or him to show you how to find library resources that pertain to your interests.
6. Go to any campus library and ask the reference librarian to demonstrate their favorite Search Tools database for doing research in your major or in a discipline that interests you.
7. Go to any campus library. Ask the reference librarian to pretend that she or he has just given you a comprehensive tour of their library's resources and services. Ask them to summarize by telling you what are the three most important things that you should remember about their library.
8. Go to any campus library with a book, journal article, or edited work in hand. Ask the reference librarian to find you one related in subject matter to the one in hand.
9. Choose a major news event. Print or copy a recent article and take it to a reference librarian at Hatcher, Science, or the Undergraduate Library. Ask them to find a deep, objective analysis about the issues arising from the event.
10. Go to the Wikipedia entry on Black Death (http://en.wikipedia.org/wiki/Black_Death) and print the "Selected sources and further reading" section at the end of the entry. Go to any library and ask the reference staff help you find a listed book or journal article that is not available electronically from the Wikipedia entry page.
11. Ask a reference librarian to help you search the history database called "Historical Abstracts" for scholarly journal articles about the Black Death. Use subject headings to narrow your search. Use the "MGetIt" button to retrieve the first page of a relevant article.
12. Go to the Documents Library. Introduce yourself to the reference librarian, tell the librarian what classes you are taking this semester, and ask her or him what Documents Library resources might be relevant to your coursework, assignments, or projects now and in the future.

13. Go to the Area Programs office in the Graduate Library. Ask a librarian to tell you what “Area Programs” is, who might use Area Programs, and if the department might help you during the course of your academic career here.
14. Go to the Special Collections Library. Ask the librarian to show you (a) primary documents pertaining to the plague pandemics that ravaged Europe in the late Middle Ages and Renaissance or (b) primary documents pertaining to your major or a topic of interest.
15. Go to the Askwith Media Library and ask the librarian to show you how to find (a) media that depicts conditions during the time of the Black Death or (b) media on a topic of personal or academic interest.
16. Go to the Map Library and ask the librarian (a) to show you maps depicting Europe before and after the Black Death, (b) to show you maps depicting population changes during this time period, or (c) to show you how to find maps on your own.
17. Go to the Music Library and ask the librarian how to find sound recordings featuring (a) “Dies Irae,” “Danse Macabre,” and “Totentanz” or (b) any period, style, or artist of your choosing.
18. Go to the Science Library and find the reference desk. Ask the librarian to help you find a scholarly article about the Black Death published in a science journal.
19. Go to the Fine Arts Library and find the reference desk. Ask the librarian to help you find a book, image or article related to the Arts and the Black Death.

APPENDIX D. GARRISON CARDS

Generally, a stopover on a Garrison game space improves the team's standing in the game; however, there are sometimes negative consequences to landing on the Garrison. On occasion, the positive impact of a game piece stopover is felt later in the game.

1. The Weregild; or The Man-Price. You kill a squire in a bar brawl. Pay his lord 40 gold for the cost of replacing him.
2. Tax time! The Duke assesses your estates and the value of all your peasants. Your bill is 70 gold.
3. A Coil of Rope. You go to "The Well" and climb down one time and take all of the gold that has accumulated. However, the White Lady that guards the well doesn't approve of this sort of disrespect, so you have to pay for the gold by losing 2 minutes of game play.
4. The Doctor is In. The Royal Physician wants to travel with you to The Hospital. If you land on The Hospital while you have this card, you are immediately treated and released.
5. A Royal Commission. An incidental piece of knowledge that came up in your research has been useful to the Duke. He gives you his fastest horse as a thank you. Your next die roll will be doubled.
6. The Sheriff Owes You a Favor. You take over as a tax collector for the day, you are paid 80 gold for your work.
7. Advance to Go. One of the Duke's messengers is passing through dangerous territory ahead. He has asked, and you have agreed, to rush him safely back to the Duke's Castle. Advance there directly.
8. You've earned a break! You visit the local tavern and you get your food for free. You are so refreshed that your next roll is doubled.
9. Broken Dishes. You visit the tavern to have a celebration, you break too many dishes and steins. You must pay 40 gold for the damage you have caused.
10. Torn Pages. Your research has come with a cost. You accidentally tore one of the documents you were investigating, and now you owe the monastery 30 gold for the damage. You also lose a web Scroll point.
11. A Caravan of Plague Victims. You wisely give a caravan of plague victims a wide berth when you see them coming down the Duke's Highway. You lose 4 minutes of game play as you wait for them to pass by.
12. Peasant Revolution. A bearded outsider has stirred up discontent amongst your normally hardworking peasants. Getting this card sends you back to The Manor House where you have to spend 5 minutes of game play and 120 gold to quell the revolt.

APPENDIX E. LIBRARY STUDY QUESTIONS

Library Study gives teams an opportunity to familiarize themselves with the features of the many search engines they may encounter during game play. If teams do not know the answer to the question, search hints are given to encourage players to take the search engine for a test drive and experiment with it in ways that enable them to answer the question. The game subtracts 2 gold for a team's wrong answers. Listed below are 5 of 51 Library Study questions.

1. When you want to know the full extent of a book's subject matter, you are quite likely to find an extended entry for the book that bears its table of contents, a sample chapter, and index in:
 - a. Amazon (at <http://www.amazon.com/> on the web)
 - b. Mirlyn (at <http://mirlyn.lib.umich.edu/> through the U-M Library)
 - c. Global Books in Print. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, click on "Find Databases," type "global?" into the box, scan the list, and click on "Global Books in Print")

Correct Answer(s): a. Amazon. Especially for recently published books, Amazon's "Look Inside This Book" shows a book's front cover, jacket, table of contents, index, and selected text such as introduction, preface, and a chapter or two.

2. When you want to see the names, words, and phrases you entered into Mirlyn (<http://mirlyn.lib.umich.edu/>) most recently, click on:
 - a. Results list
 - b. Previous searches
 - c. My account

Correct Answer(s): b. Click on "Previous searches" and Mirlyn shows your most recent searches.

3. Use the ___ instant messaging reference service to initiate a chat dialog window in your web browser into which you can type a question that a U-M librarian will answer right there on the spot.
 - a. Deep Blue
 - b. Ask Us
 - c. At Your Service

Correct Answer(s): b. Ask Us. Open your web browser to the "Ask Us" (<http://www.lib.umich.edu/askus/askusnow.html>), type in a question, submit it to U-M library staff, and they will chat with you in real time asking you for clarification or give you an answer.

4. When you are searching Mirlyn (<http://mirlyn.lib.umich.edu/>) and unsure how to spell an author's name, use Mirlyn's ___ mode to see a list of author names in the same alphabetical neighborhood as the one you type in.
 - a. Browse
 - b. Search

c. Command language

Correct Answer(s): a. Browse. Launch Mirlyn at <http://mirlyn.lib.umich.edu/> and choose its “browse” mode. Choose “Author (last name first)” from the pulldown menu, type in as much as you know of the author’s last name, first name, and middle name, and click on the “Search” button. When Mirlyn responds with an alphabetical list of author names in the same neighborhood of your entered name, scan the list and select the desired name.

5. To review the words and phrases you searched and saved in Mirlyn days, weeks, or months in the past (<http://mirlyn.lib.umich.edu/>), you must:
 - a. Sign onto your Mirlyn account
 - b. Click on “My Saved Searches”
 - c. Click on “Previous Searches”

Correct Answer(s): a and b. Sign onto your Mirlyn account and click on “My Saved Searches.” This will let you review the words and phrases you searched and saved in Mirlyn in the past. Clicking on “previous searches” lets you review your searches from the current session only.

APPENDIX F. ORACLE CARDS

Generally, a stopover has a negative impact on the team's standing in the game; however, there are sometimes positive consequences to landing on the Oracle. On occasion, the positive impact of a game piece stopover is felt later in the game.

1. I'm Covered in Bees! A peasant on one of your estates accidentally discovers a honeybee hive. He died from the attack, but you get 50 gold pieces when you sell the honey!
2. The White Lady Smiles. You are taken to "The Well," the Lady that watches over the well appears and gives you the gold that has accumulated in her well.
3. The Water Wheel. Your local blacksmith has come to you with the plans for an amazing contraption: a water wheel that powers a large grinding mill. Even though your peasants keep dying, this new machine will help you maintain profitability as the mechanical energy harnessed replaces many tens of peasants. Once installed, the water wheel pays a nice dividend. The next time you pass the manor house, you receive 50 gold.
4. Advance to Go. One of the Duke's messengers is passing through dangerous territory ahead. He has asked, and you have agreed, to rush him safely back to the Duke's Castle. Advance there directly.
5. A Scribe's Insight. One of the marginal notes in a document you are researching points you to an unexpected treasure trove of information. You are able to move to a monastery of your choice.
6. Tithe to the church. The church's works do not fade in the face of the plague. Your monthly tithe is expected as always. You pay 10% of your gold.
7. A Poacher's Price. One of your peasants poaches on a neighbor's land in order to feed his family. You must imprison the peasant and pay the neighbor. Lose 70 Gold.
8. The Cursed Rock. A peasant from a neighboring estate claims that a large rock overlooking one of your main fields is cursed. Peasants who work the field refuse to face the rock's 'wicked gaze.' Only foreigners can be hired to remove the offending rock. Lose 90 Gold.
9. Distracted in the Stacks. While searching through the stacks of one of the libraries, you are distracted by an unrelated pile of documents. You waste your allotted time in the collection and are asked to leave empty handed. The next time you land on a monastery space, you won't be able to do anything.
10. A Miraculous Well! A peasant on your land discovers a well that other peasants think is 'miraculous.' Everyone in the Duchy comes to drink the 'healing waters.' You are paid 40 gold.
11. The Gnome's Way. An old wise woman who lives in the wood knows a path through the forest that can lead you to wherever you want to go. She says it's an old highway built by 'the Gnomes.' But only she knows where it is. Play this card to take the Gnome's way to any space on the board.
12. Blessing. If you receive this card, you will feel blessed and be able to move to a monastery of your choice.
13. Build a Chapel In Honor of Your Noble Family. The next time you land on an un-owned monastery that you want to purchase, you will be granted access to this monastery for free.

14. Inspiration. When visiting a tavern, the grog is so inspiring that you know exactly how to solve your next problem. The barkeep lets you go without paying. Go immediately to any monastery of your choice and see if your inspiration pays off.
15. Half-acre of Hell. You meet a man at a crossroads and he challenges you to a game of knucklebones. You lose, and are lost for a week in a windswept plain, tormented by a persistent faint moan. Lose 40 gold, and you cannot move for 3 minutes of game play.
16. Stupor. You are taken to tavern, you are stuck there for 4 minutes, eating and drinking your way through your depression. You must pay 60 gold for the tab.
17. Hounds of the White Lady. While sleeping in the forest, you are awakened by the baying of an ethereal pack of white hounds with blood-red ears. They chase you into your dreams, exhausting you. Lose all of your Oracle and Garrison cards.
18. Forbidden Knowledge. As part of your research, you come across an ancient codex of esoteric (possibly heretical) knowledge. You don't realize this, however, until you have read aloud several pages to one of your fellow researchers. As a result of your incidental incantation, a red-suited soldier on a red horse appears. He changes the book you hold into solid gold with a glance, and then rides quietly out of the library. You gain 100 gold, but the monks of the next monastery you land on are extremely displeased when you tell them what happened. The next time you land on a monastery space you do not receive a question.
19. Dirty Pictures. A bored scribe has drawn 'inappropriate' images in the margins of the document you are looking at. Confessing your sins for looking at the pictures takes an entire turn. Lose 7 minutes of game play.

APPENDIX G. SAGE ADVICE QUESTIONS

Games players use ready reference sources such as dictionaries, almanacs, timelines, biographies, and reviews to find answers to factual questions about the Black Death. Questions include hints to help teams navigate to and use the ready reference source to answer the question. Teams pay 2 gold for a question. Teams that give incorrect answers must pay an additional 2 gold. Listed below are 5 of 22 Sage Advice questions.

1. Why search an encyclopedia for information? (Hint: Examine online encyclopedias at the U-M's Search Tools (<http://searchtools.lib.umich.edu/>), click on "Find Databases," enter "ency?" into the box, and click on one or more listed encyclopedias.)
 - a. Encyclopedias give basic information that is easy for readers who don't have in-depth knowledge, experience, or subject expertise about topics.
 - b. Encyclopedias usually end with bibliographies that cite the best books, journal articles, conference papers, and book chapters on topics.
 - c. Encyclopedias are in the public domain so you can cut and paste their contents into your report, assignment, or paper.

Correct Answer(s): a and b. Encyclopedias give basic information ... and encyclopedias usually end with bibliographies. Because few encyclopedias are in the public domain, you should always put cut-and-pasted text in quotes and add a footnote telling the source of this text.

2. How do you find encyclopedias in the U-M Library?
 - a. Ask a librarian
 - b. Go to the Reading Room at Harlan Hatcher Graduate Library and browse the bookshelves.
 - c. Open your web browser to the U-M Library's Gateway (<http://www.lib.umich.edu/>), click on "Search Tools: Articles & Databases," click on "Find Databases," enter "encyclopedia?" into the box, and browse the list.

Correct Answer(s): a, b, and c. Ask a librarian, go to the Reading Room at Harlan Hatcher Graduate Library, and open your web browser to the U-M Library's Search Tools and use Search Tools to find them.

3. Geoffrey Chaucer's *The Canterbury Tales* deals with the aftermath of the Great Death. Where can you go to learn more about Geoffrey Chaucer?
 - a. Marquis Who's Who (on the web)
 - b. American National Biography (Hint: Launch the U-M Library's Search Tools (<http://searchtools.lib.umich.edu/>), click on "Find Databases," and enter "american national?" into the box, and choose it from the list)
 - c. Who2.com (on the web)

Correct Answer(s): c. Who2.com on the web. Who2 gives biographical accounts of people living and dead. Open your web browser at <http://www.who2.com>, type in "chaucer," and retrieve a biographical account of Geoffrey Chaucer that tells about his life, accomplishments, and important dates and events.

4. A physical symptom of the bubonic plague is the eruption of buboes. Use this source to hear the correct pronunciation of this word and other words that you look up:

- a. Search for “buboes” in the Cambridge Dictionary of American English (on the web)
- b. Search for “buboes” in MedTerms (on the web)
- c. Search for “buboes” in the American Heritage Dictionary of the English Language (on the web)

Correct Answer(s): c. Search for “buboes” in The American Heritage Dictionary of the English Language, click on the entry for “Bubo,” and click on the sound file to hear the pronunciation.

5. In what web resource would you find synonyms for the word “plague?”
 - a. Search for “plague” in the Wordsmyth Dictionary-Thesaurus (on the web)
 - b. Search for “plague” in Roget’s II: The New Thesaurus (on the web)
 - c. Search for “plague” in Allwords.com (on the web)

Correct Answer(s): a and b. Search for “plague” in the Wordsmyth Dictionary-Thesaurus and Roget’s II: The New Thesaurus.

APPENDIX H. TEXTS OF OTHER GAME SPACES

Castle of the Duke. The Duke is eager to hear detailed news from your labors. He is so pleased by your personal report, that he pays out a small bonus for your trouble.

Fox Hunt. While taking a break from your research labors, you, your uncle and your cousins decided to retire into the forest. You want to lose yourself in a fox hunt, to put distance between your noble lifestyle and the toxic horror that has fallen upon the duchy and her lesser inhabitants. Unfortunately, the woodsmen who cares for the forests of your estate has himself fallen ill to the plague and a great many of the trails he would have maintained have fallen into disrepair after a string of storms. When you come over a rise, your horse is startled by a massive entangling deadfall and she throws you into the thicket where your leg is broken. Your cousins rush you to the Duke's Hospital where a surgeon can set the bone.

Hospital. You are just visiting the hospital. Behind the high walls of the old estate you hear shrieks and moans, but what disturbs you more are the long stretches of silence punctuated only by the faint hiss of dry earth being turned by a spade.

Manor House. The cool, shaded grounds of your ancestral estates provide a brief comfort. But the tense look in the faces of your peasants and freedmen only serves to sharpen your own anxiety. In a troubled time such as this, one can never truly find peace, even at home.

Public House, Wandering Way. The ladies bark with laughter and the gentlemen cheer when you enter the tavern. Flagons clank and the froth of the brew flops across warped old tables. Everyone is in good cheer, and you are as well until you leave poorer by 5 gold pieces and no further along with your quest.

Tavern, Drunken-Dwarf. (Same as the Public House above.)

Well of the White Lady. The face of the waters grow cloudy with portent, but then the disturbance fades. You drop five pieces of gold into the well in hopes of good fortune.

APPENDIX I. WEB QUESTIONS

The *Defense of Hidgeon* randomly selected questions from this list for teams whose game pieces landed on the monastery libraries of St. Isidore. Listed below are 5 of 20 Web questions.

1. Select web page(s) from the list below that best answer this question: What alternative(s) do plague revisionists give in place of the theory that rats caused the spread of the bubonic plague?
 - a. Black Death: Wikipedia, the free encyclopedia
 - b. Secrets of the Dead: Mystery of the Black Death (PBS)
 - c. MSN Encarta: Black Death

Correct Answer(s): a. Black Death: Wikipedia, the free encyclopedia. See its “Causes” section.

2. Select web page(s) from the list below that best answer this question: Of the three types of bubonic plague, which ones could humans contract from fleas?
 - a. Plague and Public Health in Renaissance Europe
 - b. Mr. Dowling’s Bubonic Plague Page
 - c. The Black Death: How it was Transmitted

Correct Answer(s): c. The Black Death: How it was Transmitted. The page entitled “How it was Transmitted” tells that bubonic and septicemic plague are transmitted by the bite of an infected flea.

3. Select web page(s) from the list below that best answer this question: How did the Black Death of the middle 14th century change the lives of the everyday people who survived the epidemic?
 - a. Black Death: Wikipedia, the free encyclopedia
 - b. The Great Mortality, Part 3, from About.com: Medieval History
 - c. On the trail of the Black Death

Correct Answer(s): a and b. See the section entitled “Consequences” (Black Death: Wikipedia). The plague’s aftermath is addressed in three sections entitled “Love and Money,” “Land and Livelihoods,” and “Life after Death” (The Great Mortality).

4. Select web page(s) from the list below that best answer this question: Medical faculty from Paris gave the pope this astronomical cause of the Black Death.
 - a. The ORB: The Online Reference Book for Medieval Studies: The Black Death
 - b. BBC History: Black Death
 - c. Firstscience: History of the Black Death

Correct Answer(s): a. The ORB: The Online Reference Book for Medieval Studies: The Black Death. “The pope sent to Paris to obtain the opinions of the medical faculty there in 1348. They studied the problem for a time and returned a report. The good professors opined that the disaster was caused by a particularly unfortunate conjunction of Saturn, Jupiter and Mars in the sign of Aquarius that had occurred

in 1345. This conjunction cause hot, moist conditions, which cause the earth to exhale poisonous vapors.”

5. Select web page(s) from the list below that best answer this question: What gene could have provided some people with immunity to the Black Death of the mid-14th century?
 - a. Eyewitness to History: The Black Death, 1348
 - b. On the trail of the Black Death
 - c. Secrets of the Dead: Mystery of the Black Death (PBS)

Correct Answer(s): b and c. Secrets of the Dead: Mystery of the Black Death (PBS). See the “Clues and Evidence” section that says, “Dr. Stephen O’Brien felt that the mutated CCR5 gene, delta 32, may have prevented the plague from being able to enter its host’s white blood cells” (On the Trail of the Black Death). The PBS web page confirms this finding about delta 32.

APPENDIX J. ENCYCLOPEDIA QUESTIONS

The *Defense of Hidgeon* randomly selected questions from this list for teams whose game pieces landed on the monastery libraries of St. Thomas. Listed below are 5 of 23 Encyclopedia questions.

1. Which encyclopedia(s) describe the specific act of biological warfare that introduced the Black Death into Europe?
 - a. Black Death. (2001). In George Childs Kohn (Ed.), *Encyclopedia of Plague and Pestilence* (pp. 27-29). New York: Facts on File, Inc. [Call number: UGL RA 649 .E531 2001]
 - b. Plague Decimates European Population, 1347-1352. (2003). In *DISCovering World History* (online ed.). Detroit: Gale. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "discovering?" into the box, and choose the *DISCovering World History* from the list. Then search for this article.)
 - c. Cohn, Samuel, Jr. (2003). Black Death. In Paul Demeny and Geoffrey McNicoll (Eds.), *Encyclopedia of Population* (Vol. 1, pp. 98-101). New York: Macmillan Reference USA. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)

Correct Answer(s): b.

The entry in *DISCovering World History* reads: "Europe's infection resulted from an act of bacteriological warfare: Mongol-Tartar armies, attacking links in the Italian caravan trade from China, catapulted dead bodies infected with plague over the walls of Kaffa in the Crimean region of southern Russia. These armies hoped that fear of the disease would drive Italian merchants from the western edges of a disintegrating Mongol Empire."

2. Which encyclopedia(s) name great luminaries from the middle of the 13th century who succumbed to the Black Death?
 - a. Black Death. (2007). In *Encyclopædia Britannica Online*. (Hint: Launch the U-M Library web page at <http://www.lib.umich.edu/>, choose the link "Reference sources / Fast Facts" in the bottom center, click on the *Encyclopaedia Britannica Online* link, and search for the article.)
 - b. Gottfried, Robert S. (1983). Black Death. In *Dictionary of the Middle Ages* (Vol. 2, pp. 257-267). New York: Charles Scribner's Sons. [Call number: GRAD D 114 .D51 1982]
 - c. Kastenbaum, Robert. (2003). Black Death. In Robert Kastenbaum (Ed.), *Macmillan Encyclopedia of Death and Dying* (Vol. 1, pp. 62-66). New York: Macmillan Reference USA. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)

Correct Answer(s): a. Here is a quote from the *Encyclopaedia Britannica Online*: "Even the great and powerful, who were more capable of flight, were struck down: among royalty, Eleanor, queen of Peter IV of Aragon, and King Alfonso XI of Castile succumbed, and Joan, daughter of the English king Edward III, died at Bordeaux on the way to her wedding with Alfonso's son. Canterbury lost two successive archbishops, John de Stratford and Thomas Bradwardine; Petrarch lost not only Laura, who inspired so many of his poems, but also his patron, Giovanni Cardinal Colonna. The papal court at Avignon was reduced by one-fourth."

3. During the plague, civilian populations blamed the plague on the Jews for poisoning wells, food, and drinking water, and attacked them. Which encyclopedia(s) name the high ranking secular and religious officials who denounced these attacks on the Jews?
 - a. Roberts, Cynthia A. (2003). Safety of Water. In Solomon H. Katz (Ed.), *Encyclopedia of Food and Culture* (Vol. 3, pp. 516-521). New York: Charles Scribner's Sons. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)
 - b. Davis, Tim. (2005). Famine, the Black Death, and the Afterlife. In Edward Bleiberg (Ed.), *Arts and Humanities Through the Eras* (Vol. 3: Medieval Europe 814-1450, pp. 366-368). Detroit: Gale. (See the hint above to find the Gale Virtual Reference Library database.)
 - c. Marcus, Ivan. (2005). Judaism: Judaism in Northern and Eastern Europe to 1500. In Lindsay Jones (Ed.), *Encyclopedia of Religion* (2nd ed., Vol. 7, pp. 5011-5014). Detroit: Macmillan Reference USA. (See the hint above to find the Gale Virtual Reference Library database.)

Correct Answer(s): b. Tim Davis' article tells how Clement VI called for the excommunication of Christians who persisted in persecuting the Jews. Pedro IV of Aragon attempted to give protection to the Jews of his kingdom and prosecuted Christian assailants.

4. Select encyclopedia(s) from the list below that best answer this question: "The will of God" was credited as the cause of sickness and death from the Black Death and other maladies until the development of what theory in the late 1800s?
 - a. Last, John M. (2002). Black Death. In Lester Breslow (Ed.), *Encyclopedia of Public Health* (Vol. 1, pp. 122-123). New York: Macmillan Reference USA. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)
 - b. Ebersole, Gary. (2005). Death. In Lindsay Jones (Ed.), *Encyclopedia of Religion* (Vol. 4, pp. 2235-2245). Detroit: Macmillan Reference USA. (See the hint above to find the Gale Virtual Reference Library database.)
 - c. Kiple, Kenneth. (2001). Health and Disease. In Peter Stearns (Ed.), *Encyclopedia of European Social History* (Vol. 2, pp. 205-217). Detroit: Charles Scribner's Sons. (See the hint above to find the Gale Virtual Reference Library database.)

Correct Answer(s): c. Here is a relevant quote from Kenneth Kiple's encyclopedia entry: "... until the beginning of germ theory in the late 1800s, people did not know what caused them to be sick and to die. When court chroniclers and historians felt pressed to account for the presence of diseases, 'God's will' was a handy explanation — a "will" that was routinely credited with epidemics that delivered misery and death to thousands, even hundreds of thousands, of individuals. Perhaps because God might be credited but never blamed, this explanation was also generally laden with the suspicion that divine will had gotten a helping hand from secular sources such as the ragged and dirty poor, or outsiders, or Jews, all of whom came to comprise the usual scapegoats during epidemics."

5. Select encyclopedia(s) from the list below that best answer this question: Why did the plague cause people to take up self-flagellation?
 - a. Courtney, F. J. (2003). Flagellation. In *New Catholic Encyclopedia* (2nd ed., Vol. 5, pp. 754-

- 755). Detroit: Gale. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)
- b. Todd, Jesse T. (1999). Self-Mutilation. In Wade Clark Roof (Ed.), *Contemporary American Religion*, (Vol. 2, pp. 661-662). New York: Macmillan Reference USA. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)
- c. Davis, Tim. (2005). Famine, the Black Death, and the Afterlife. In Edward Bleiberg (Ed.), *Arts and Humanities Through the Eras* (Vol. 3: Medieval Europe 814-1450, pp. 366-368). Detroit: Gale. (Hint: Launch the U-M Library's Search Tools at <http://searchtools.lib.umich.edu/>, choose "Find Databases," type "gale?" into the box, and choose the Gale Virtual Reference Library from the list. Then search for this article.)

Correct Answer(s): a and c. The reasons for self-flagellation are discussed in encyclopedia articles by both Courtney and Davis. Here's a quote from Davis, "The religious fervor accompanying the Black Death could be seen in a most extreme form in the practice of flagellation, self-administered whippings that were intended to punish the body as penance, both for personal sins and for the sins of mankind which were thought to have caused the plague ... Some believed the plague was signaling the end of the world, and groups of flagellants began to organize and march about Europe calling for general repentance. Processions of hundreds of flagellants are recorded ... Their whips were made of leather thongs, and many brandished instruments with barbed metal tips. Spectators frequently were so moved by the emotional and disturbing scene that they themselves joined in the penance."

APPENDIX K. BOOKS IN MIRLYN QUESTIONS

The *Defense of Hidgeon* randomly selected questions from this list for teams whose game pieces landed on the monastery libraries of St. Jerome. Listed below are 5 of 21 Books questions.

1. After building a comfortable level of understanding with encyclopedias, start with this book because its author summarizes what is known about the Black Death from the many books, journal articles, book chapters, and conference papers that have been written on this topic to date.
 - a. Benedictow, Ole J. (2004). *The Black Death, 1346–1353: The complete history*. Woodbridge Suffolk: Boydell Press. [Call number: GRAD RC 175 .B461 2004]
 - b. Ziegler, Philip. (1969). *The Black Death*. New York: J. Day. [Call number: GRAD RC 178 .A1 Z66]
 - c. Deaux, George. (1969). *The Black Death, 1347*. New York: Weybright & Talley. [Call number: GRAD RC 178 .A1 D28 1969]

Correct Answer(s): b. Ziegler's book. If something about the Black Death interests you, note the sources that Ziegler cites and read them for more detail. Because Ziegler's book was published in 1969, you'll have to consult more recent books for new themes, issues, and controversies about the Black Death.

2. Why read the many books that survey themes and subtopics connected to the Black Death such as its origins, nature, clockwise sweep through Europe, the flagellant movement, and the persecutions of the Jews, when you save time reading about these same themes in much shorter encyclopedia articles?
 - a. Books are more current than encyclopedia articles
 - b. Unlike encyclopedia articles, books are written by scholars, scientists, and researchers who are world experts on their chosen topics
 - c. Books synthesize human knowledge about topics, they span large intellectual spaces, tackle mammoth problems, make more intensive cases than all other literary genres, and undergo rigorous editorial review.

Correct Answer(s): c. Read encyclopedia articles to build a firm foundation of understanding, then delve into the detail, complexity, and sophistication of books.

3. Because so many books' authors, e.g., Byrne, Deaux, Gasquet, Gottfried, Ziegler, survey the same Black Death themes, for example, the origin of the disease, its nature, clockwise sweep through Europe, the flagellant movement, and the persecutions of the Jews, in their books, why should you bother to read more than one of their books?
 - a. To determine whether, how, and why they arrive at different interpretations, conclusions, and ideas about a particular Black Death theme
 - b. Because there will be nothing new to learn about the Black Death after reading these books
 - c. To find additional sources to read in their bibliographies

Correct Answer(s): a and c. Read multiple accounts to determine whether, how, and why they arrive at different interpretations, conclusions, and ideas about a particular Black Death theme, to reinforce

prevailing points of view regarding Black Death themes, and to find additional sources to read in their bibliographies.

4. Which book author(s) insert primary documents such as first-person accounts of living and experiencing daily life during the Black Death into their books?
 - a. Horrox, Rosemary. (1994). *The Black Death*. New York: Manchester University Press. [Call number: UGL RC 178 .A1 B53 1994]
 - b. Aberth, John. (2005). *The Black Death: The great mortality of 1348–1350*. New York: Palgrave MacMillan. [Call number: UGL RC 178 .A1 A2371 2005]
 - c. Crawford, Raymond. (1914). *Plague and pestilence in literature and art*. Oxford: Clarendon Press. [Call number: MEDICAL RC 172 .C89]

Correct Answer(s): a and b. Horrox and Aberth.

5. Why do authors insert in their books primary documents such as first-person accounts of living and experiencing daily life during the Black Death?
 - a. Because the original copies of primary documents are usually unique and reside in foreign archives that few readers are able to visit
 - b. Because authors know it is more efficient to cite eyewitnesses verbatim rather than paraphrase their words
 - c. Because book authors such as historians of the Black Death are writing many centuries after the actual event and use the content of primary documents to substantiate their claims, ideas, and interpretations

Correct Answer(s): a and c. Authors like Horrox and Aberth are historians writing many centuries after the Black Death. Because they were not present to experience and collect data during the Black Death, they use the next best thing, that is, primary documents written by eyewitnesses who experienced the Black Death in the 14th century. Also, most primary documents reside in foreign archives that would be prohibitively expensive to visit and limit access to their collection to only the most serious scholars. Authors like Horrox and Aberth translate primary documents into English for their readers and publish them in their English-language books.

APPENDIX L. EDITED WORKS IN MIRLYN QUESTIONS

The *Defense of Hidgeon* randomly selected questions from this list for teams whose game pieces landed on the monastery libraries of St. Catherine of Alexandria. Listed below are 5 of 10 Edited Works questions.

1. Instead of being written by one person, some books are collections of papers that one or more editors collect and publish in a book. Such “edited works” are typical of scholarship in the humanities and social science disciplines. Editors invite scholars who have expertise in a certain area to write a chapter on a theme that describes the book as a whole. Most scholars respond to the editor’s request by writing papers on an aspect of the theme that matches their area of expertise and personal interests so there is little flow or cohesiveness from chapter to chapter. Which one of these three edited works is an exception to the rule and has flow and cohesiveness from chapter to chapter, making it seem like one person — not a dozen persons — wrote the book?
 - a. Nardo, Don. (1999). *The Black Death*. San Diego, CA: Greenhaven Press. [Call number: UGL RC 178 .A1 B5821 1999]
 - b. Bowsky, William M. (1971). *The Black Death: A turning point in history?* New York: Holt, Rinehart and Winston. [Call number: UGL RC 172 .B79]
 - c. Frantzen, Allen J. & Moffat, Douglas (Eds.). (1994). *The work of work: Servitude, slavery, and labor in medieval England*. Glasgow: Cruithne Press. [Call number: GRAD HD 4865 .G7 W671 1994]

Correct Answer(s): a. Nardo’s *Black Death* has large measures of flow and cohesiveness that make it seem like one person wrote the book, not about a dozen.

2. The content of an edited work is much more apparent in the titles of individual chapters than in the edited work’s title. When you retrieve Mirlyn records for edited works, these records do not always list the titles of the individual chapters. Search Mirlyn (<http://mirlyn.lib.umich.edu/>) for the edited works below and choose the ones for which Mirlyn lists individual chapters.
 - a. Frantzen, Allen J. & Moffat, Douglas (Eds.). (1994). *The work of work: Servitude, slavery, and labor in medieval Europe*. Glasgow: Cruithne Press. [Call number: GRAD HD 4865 .G7 W671 1994]
 - b. French, Roger, et al. (Eds.). (1998). *Medicine from the Black Death to the French disease*. Aldershot, Eng.: Ashgate. [Call number: UGL R 141 .M461 1998]
 - c. *The Plague reconsidered: A new look at its origin and effects in 16th and 17th century England*. (1977). Matlock, Derbyshire: Local Population Studies in association with the S.S.R.C. Cambridge Group for the History of Population and Social Structure. [Call number: PUB RC 178 .G7 P53 1977]

Correct Answer(s): a and b. Mirlyn records list chapter titles for two edited works, “The Work of Work” and “Medicine from the Black Death to the French Disease.”

3. To find out whether an edited work emanated from a conference, symposium, or workshop, read the introduction, preface, or a special added statement that editors insert between the front cover and the first chapter. Which of these edited works came from a conference?

- a. Campbell, Bruce M. S. (Ed.). (1991). Before the Black Death: Studies in the “crisis” of the early fourteenth century. Manchester, Eng.: Manchester University Press. [Call number: GRAD HC 254 .B441 1991]
- b. Williman, Daniel (Ed.). (1982). The Black Death: The impact of the fourteenth-century plague: Papers of the eleventh annual conference of the center for Medieval & Early Renaissance Studies. Binghamton, NY: State University of New York at Binghamton. [Call number: GRAD RC 171 .S81 1977]
- c. Henderson, John & Wall, Richard. (1994). Poor women and children in the European past. London: Routledge. [Call number: GRAD HV 4084 .A3 P661 1994]

Correct Answer(s): a and b. Facing the title page of “Before the Black Death” is the editor’s note “For the participants of the Anglo-American seminar on the medieval economy and society, Chester, 1989.” The editor of “The Black Death” cites the name of the conference in his book’s title.

4. Editors of edited works ask scholars who have written books to contribute chapters, sometimes on the same topics as their books, and other times on different subjects. For example, editor Daniel Williman asked seven scholars to contribute chapters to his book entitled “The Black Death: The impact of the fourteenth-century plague” (Binghamton, NY: State University of New York at Binghamton, 1982). Search Mirlyn to determine which of this book’s authors has written other books specifically on the Black Death.

- a. Michael Dols
- b. Nancy Siraisi
- c. Siegfried Wenzel

Correct Answer(s): a. Michael Dols has written a book called “The Black Death in the Middle East.” It may be the only English-language book published on this topic to date. [Call number: UGL RC 179.I6 D67]

5. How do you find books in the U-M Library that are edited works? [Here is an edited work that you can use as an example: Frantzen, Allen J. & Douglas Moffat (Eds.). (1994). The work of work: Servitude, slavery, and labor in medieval Europe. Glasgow: Cruithne Press.]

- a. Search Mirlyn (<http://mirlyn.lib.umich.edu/>)
- b. Search CSA databases limiting them to “Arts & Humanities” databases (Hint: Start at Search Tools (<http://searchtools.lib.umich.edu/>), click on “Find Databases,” enter “csa?,” and choose any database from the list. When the database opens, “Arts & Humanities” from the “Subject Area” pulldown menu, and enter author names and title words from the example above into the box.)
- c. Search JSTOR (Hint: Start at Search Tools (<http://searchtools.lib.umich.edu/>), click on “Find Databases,” enter “jstor?,” and choose JSTOR from the list. When JSTOR opens, click “Search,” and enter author names and title words from the example above into the box.)

Correct Answer(s): a. Searching Mirlyn will retrieve edited works in the U-M Library. If you are scanning Mirlyn retrievals and notice the phrase “edited by” or “editors,” you have probably retrieved an edited work. Use call numbers to fetch the book from the shelves of the U-M Library. If your JSTOR retrievals include edited works, you will still have to search Mirlyn to get their call numbers.

APPENDIX M. JOURNAL-ARTICLE DATABASE QUESTIONS

The *Defense of Hidgeon* randomly selected questions from this list for teams whose game pieces landed on the monastery libraries of St. Albert. Listed below are 5 of 16 Journal-article Database questions.

1. Two authors, Slack and Appleby, arrive at two totally different reasons for the disappearance of the plague. What are these two reasons? (Find the Slack and Appleby articles on the JSTOR database. Open the U-M's Search Tools (<http://searchtools.lib.umich.edu/>), click on "Find Databases," type in "jstor?," and choose JSTOR from the list. When JSTOR appears, do two separate searches, one for the author Slack and a few words from his article's title, e.g., "slack and disappearance and plague and view," and a second for the author Appleby and a few words from his article's title, e.g., "appleby and disappearance and plague and puzzle.")
 - a. Quarantine of sick human populations
 - b. Immunity of rat populations to the plague bacillus
 - c. Replacement of sod, grass, and wood homes with brick-and-mortar construction

Correct Answer(s): a and b. Appleby attributes the plague's disappearance to the immunity of rat populations to the plague bacillus. Slack puts his money on quarantines.

2. What is the most efficient way to search JSTOR to determine whether Paul Slack has written anything else on the disappearance of the plague? (Hint: Navigate to JSTOR at Search Tools (<http://searchtools.lib.umich.edu/>), choose "Find Databases," enter "jstor?" into the box, and choose JSTOR from the list.)
 - a. Enter the name "paul slack" into JSTOR's basic search
 - b. Enter the name "paul slack" into JSTOR's advanced search and select the "author" option from the pulldown menu
 - c. Enter the name "paul slack" into JSTOR's advanced search, select the "author" option from the pulldown menu, and check the "review" type

Correct Answer(s): b. The most efficient way to accomplish this is to enter the name "paul slack" into JSTOR's advanced search and select the "author" option from the pulldown menu. Your retrievals will include both articles and books Slack has written. Click on JSTOR links to retrieve articles. Search Mirlyn to determine whether the U-M Library owns the books.

3. JSTOR tells us that one article cites Appleby's "The Disappearance of the Plague." This article is entitled "Public Health and the Civilizing Process," and it was written by Johan Goudsblom, but it is not about the disappearance of the plague. Why, then, does Goudsblom cite Appleby? (Hint: Navigate to JSTOR at Search Tools (<http://searchtools.lib.umich.edu/>), choose "Find Databases," enter "jstor?" into the box, and choose JSTOR from the list.)
 - a. When Goudsblom presents his own hypothesis for the plague's disappearance, he cites Appleby as an acknowledgment that other plague-disappearance theories such as Appleby's exist
 - b. When Goudsblom mentions the disappearance of the plague from Marseilles in the early 18th century, he cites Appleby's article because it includes quarantine as one of the many reasons for the plague's disappearance

- c. Goudsblom needs to pad his bibliography with as many references as possible to impress fellow scholars so he has added the Appleby citation even though it does not support his argument

Correct Answer(s): b. When Goudsblom speculates in his article about quarantine as one of several reasons for the plague's disappearance, he cites Appleby's article as evidence that other scholars have suggested that quarantines played a major role in eliminating the plague.

4. Searches of CSA's Biological Sciences database yield three articles that test whether the plague bacillus *Yersinia pestis* is present in the dental pulp of medieval plague victims from France. Two articles describe positive results, that is, the successful detection of the bacillus. Which articles are these? (Hint: To find journal articles in the U-M Libraries, start at the Library home page (<http://www.lib.umich.edu>), click the "Find e-journals" radio button on the far left under "General Search," enter the journal name into the box, click the "Go" button, click on the journal name in the list, and narrow down to the exact year, volume, and issue of the journal.)
- a. Raoult, Didier, et al. (2000). Molecular identification by "suicide PCR" of *Yersinia pestis* as the agent of Medieval Black Death. *Proceedings of the National Academy of Sciences*, 97(23), 12800-12803.
- b. Gilbert, M., Thomas P., et al. (2004). Absence of *Yersinia pestis*-specific DNA in human teeth from five European excavations of putative plague victims. *Microbiology*, 150(2), 341-354.
- c. Drancourt, Michel, et al. (1998). Detection of 400-year-old *Yersinia pestis* DNA in human dental pulp: An approach to the diagnosis of ancient septicemia. *Proceedings of the National Academy of Sciences*, 95(21), 12637-12640.

Correct Answer(s): a and c. Articles by Raoult et al. and Drancourt et al. report successful detection of *Yersinia pestis* in the teeth of medieval plague victims.

5. From searching CSA's Biological Sciences database, it appears that only two research teams are conducting experiments that use dental pulp as a preserved source of bacterial DNA to determine that *Yersinia pestis* was the etiologic agent of the Black Death: (1) the team of Drancourt, Raoult, Aboudharam, Crubezy, Larrouy, etc., and (2) the team of Gilbert, Cuccui, White, Lynnerup, Titball, Cooper, and Prentice. What would you do next to determine whether other research teams are conducting comparable experiments and whether their conclusions agree with the first team or second team?
- a. Search the Biological Sciences database and other science databases for the names of the researchers on these teams, e.g., Drancourt, Raoult, Gilbert, Cuccui, etc. (Navigate to biology databases through the U-M's Search Tools (<http://searchtools.lib.umich.edu/>), choose "Power Search," choose "Science" from the "By subject" pulldown menu on the left, choose a biology category from the menu, scroll through the list of biology databases in the center, and choose one.)
- b. Search the Historical Abstracts database and other humanities databases for keywords such as "dna," "plague," and "dental." (Navigate to history databases through the U-M's Search Tools (<http://searchtools.lib.umich.edu/>), choose "Power Search," choose "Arts & Humanities" from the "By subject" pulldown menu on the left, choose "History" from the menu, scroll through the list of history databases in the center, and choose one.)
- c. Search the Biological Sciences database and other science databases for the keywords "dna," "plague," and "dental." (Navigate to biology databases through the U-M's Search Tools

(<http://searchtools.lib.umich.edu/>), choose “Power Search,” choose “Science” from the “By subject” pulldown menu on the left, choose a biology category from the menu, scroll through the list of biology databases in the center, and choose one.)

Correct Answer(s): c. Conduct additional keyword searches of Biosis and keyword searches in other science databases for the keywords “dna,” “plague,” and “dental.” Be careful to choose science databases over humanities and social sciences databases because the sciences are more likely to feature experiments led by research teams. You want to conduct keyword searches rather than searches for names because name searching only retrieves articles by the two teams you already know, not entirely new teams. By the way, results of keyword searches in the Medline and PubMed databases turn up two other teams but both are conducting experiments on victims from ancient plagues that predate the Black Death, more recent experiments by the Drancourt team, and published comments between disagreeing teams.

APPENDIX N. CITATION DATABASE QUESTIONS

The *Defense of Hidgeon* randomly selected questions from this list for teams whose game pieces landed on the monastery libraries of St. Dominic de Guzman. Listed below are 5 of 13 Citation Database questions.

1. Lead author of a 1998 article, Michel Drancourt is a member of a research team that has successfully detected the plague bacillus in ancient DNA (aDNA). Use cited references to his article to find trends pertaining to the practice of testing ancient DNA (aDNA). (Hint: Use the Web of Science's Cited Reference search as follows.)

Start at Search Tools (<http://searchtools.lib.umich.edu>), click on "Find Databases," and type "isi?" into the box. Choose "ISI Web of Science." Click on its "Cited Ref Search" button. Into the "Cited Author" box type:

drancourt m

Into the "Cited Year(s)" box type:

1998

Click on the "Search" button.

Check listed entries referring to Drancourt's 1998 article in the Proceedings of the National Academy of Sciences and click the "Finish Search" button. Scan the abstracts of retrieved entries to learn about ongoing trends pertaining to the practice of testing aDNA.)

- a. Using aDNA from unearthed skeletons, several other research teams have reported positive findings regarding the cause of death — bubonic plague.
- b. Analyses of aDNA are still controversial. At this time, researchers should be perfecting aDNA methods to avoid questions about contaminating samples with modern DNA sequences and other problems.
- c. Researchers are going ahead with aDNA analyses, not necessarily to study the plague, but to study other calamities, e.g., Plague of Athens, tuberculosis, Irish potato famine pathogen, Napoleon's retreat from Russia, etc.

Correct Answer(s): b and c. Other than Drancourt's team, no other research teams have used aDNA to positively identify *Yersinia pestis*, the plague bacillus, in the remains of ancient plague victims. Several papers caution researchers about aDNA methods, advising them to perfect aDNA methods and avoid contamination. Regardless of these cautions, researchers are going ahead with aDNA analyses, not necessarily to study the plague, but to study other calamities.

2. Publishing articles in the "Economic History Review" entitled "Disappearance of the Plague" in 1980 and 1981, Andrew B. Appleby and Paul Slack, respectively, arrived at separate and different conclusions about its disappearance. Since the publication of their articles over 25 years ago, other researchers have studied this same topic but they didn't give their articles the same titles (i.e., "Disappearance of the Plague") nor did they publish them in the same journal. Who are these scholars and what are their articles' titles? (Hint: Use the ISI Web of Science's Cited Reference search to find them.)

Start at Search Tools (<http://searchtools.lib.umich.edu>), click on "Find Databases," and type "isi?" into the box. Choose "ISI Web of Science." Click on its "Cited Ref Search"

button. Into the “Cited Author” box type:

appleby

Into the “Cited Year(s)” box type:

1980

Click on the “Search” button.

Check listed entries referring to Appleby’s 1980 article in the “Economic History Review” and click the “Finish Search” button. Scan retrieved entries for potentially relevant titles. Repeat this same process for Paul Slack. Choose from this list of citations:

- a. Bond, Harold W. (1999). The scourge of tuberculosis, smallpox, and syphilis: Epidemics that succeeded the plague as Europe’s number one killer. *Journal of Social and Biological Structures*, 21(1), 32-40.
- b. Eckert, E. A. (2000). The retreat of plague from central Europe, 1640-1720: A geomedical approach. *Bulletin of the History of Medicine*, 74(1), 1-28.
- c. Kunitz, S. J. (1983). Speculations on the European mortality decline. *Economic History Review*, 36(3), 349-364.

Correct Answer(s): b and c. The Bond article is made up. Articles by Eckert and Kunitz are for real but because their titles omit the word “disappearance” and typical synonyms, e.g., eradication, ebbing, recession, etc., it is hard to predict what keywords would retrieve relevant articles. Using the Web of Science’s Cited Reference search is the most efficient way to retrieve relevant articles on this “disappearance” topic.

3. Writing in a 2005 issue of “Genes and Immunity,” S. Hummel et al. hypothesizes that the mutant allele of the chemokine receptor CCR5 gene (CCR5-Delta32) which confers resistance to HIV-1 infection might have originated long before the Black Death in the 14th century. What other researchers present evidence that supports or directly refutes Hummel’s findings about the mutant allele’s origins? (Hint: Use the ISI Web of Science’s Cited Reference search to find research that cites and either supports or refutes Hummel’s work.)

Start at Search Tools (<http://searchtools.lib.umich.edu>), click on “Find Databases,” and type “isi?” into the box. Choose “ISI Web of Science.” Click on its “Cited Ref Search” button. Into the “Cited Author” box type:

hummel s*

Into the “Cited Year(s)” box type:

2005

Click on the “Search” button.

Check listed entries referring to S. Hummel’s 2005 article in “Genes and Immunity” and click the “Finish Search” button. Scan and select retrieved entries for potentially relevant titles and abstracts. Choose from this list of citations:

- a. Hedrick, Philip W. & Verrelli, Brian C. (2006). ‘Ground truth’ for selection on CCR5-Delta 32. *Trends in Genetics*, 22(6), 293-296.

- b. Salem, Abdel-Halim & Batzer, Mark A. (2007). Distribution of the HIV resistance CCR5-Delta 32 allele among Egyptians and Syrians. *Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*, 616(1-2), 175-180.
- c. Cohn, Samuel K. & Weaver, L. T. (2006). The Black Death and AIDS: CCR5-Delta 32 in genetics and history. *QJM, An International Journal of Medicine*, 99(8), 497-503.

Correct Answer(s): a and c. Salem & Batzer's research detects the mutant allele in Egyptian and Syrian populations but it doesn't discuss the allele's historic origins. Cohn & Weaver cite historical evidence that the Black Death could not have caused the mutation because some of the heaviest casualties of the Black Death were in the Mediterranean, the very region where descendants account for the lowest incidences of the HIV-1 resistant allele. Hedrick & Verrelli assert that "new research shows that the frequency of CCR5-Delta32 in Bronze Age samples is similar to that seen today, pushing the observed age of the allele back to at least 3000 and possibly 5000 years ago."

4. In addition to identifying authors who cite books, what additional information does the ISI Web of Science include for books? (Hint: Use the ISI Web of Science's Cited Reference search to find cited references to books.)

Start at Search Tools (<http://searchtools.lib.umich.edu>), click on "Find Databases," and type "isi?" into the box. Choose "ISI Web of Science." Click on its "Cited Ref Search" button. Into the "Cited Author" box type:

cohn sk*

Into the "Cited Year(s)" box type:

2002

Click on the "Search" button.

Check listed entries referring to Cohn's book entitled "The Black Death Transformed" and click the "Finish Search" button. Scrutinize retrieved entries. Choose from this list of additional information:

- a. Tables of contents for books
- b. Book reviews
- c. The preface and other introductory material in books

Correct Answer(s): b. Book reviews. For example, about a third of the cited references to Samuel K. Cohn's book are book reviews. ISI Web of Science does not include the innards of books such as their tables of contents, prefaces, introductory material, or back-of-the-book indexes.

5. Which of the cited references to William J. Courtenay's "The effect of the Black Death on English higher education" published in a 1980 issue of "Speculum" would you pursue to learn more about this very topic? (Hint: Use the ISI Web of Science's Cited Reference search.)

Start at Search Tools (<http://searchtools.lib.umich.edu>), click on "Find Databases," and type "isi?" into the box. Choose "ISI Web of Science." Click on its "Cited Ref Search" button. Into the "Cited Author" box type:

courtenay wj*

Into the “Cited Year(s)” box type:

1980

Click on the “Search” button.

Check listed entries referring to Courtenay’s article and click the “Finish Search” button.

Scrutinize retrieved entries and choose from this list:

- a. Swanson, R. N. (1985). Universities, graduates, and benefices in later medieval England. *Past and Present*, (106), 28-61.
- b. Rosenthal, J. T. (1982). English medieval education since 1970: So near and yet so far. *History of Education Quarterly*, 22(4), 499-511.
- c. Jackson, Paul N. (1993). Education in medieval England after the Black Death. *Social Science History*, 17(3), 447-473.

Correct Answer(s): a and b. Both Swanson and Rosenthal articles pertain directly to education in England after the Black Death. If you were researching this topic, start with the Rosenthal article is because it is a review of work published between 1970 and 1980 on English education from 1100 to 1500.

APPENDIX O. GAME SIGNUP SHEET

Playing the Game

To play the game, go to <http://storygame.si.umich.edu/> and enter your team's name and password.

Only one team member can be signed onto the game at one time so consider dividing game-play tasks up among your fellow team players.

If you are sent to the Hospital, print the text that describes the exact task you must perform and take it with you to a U-M Library. When you are done, ask the librarian for a pass code. If the librarian cannot find a pass code, tell them to look for the pass codes (1) in a notebook, binder, or reference Wiki that contains library news, instructions, bulletins, etc., (2) in an email message from their library reference supervisor, or (3) at <http://www.lib.umich.edu/askus/staffonly/blackdeath>. Ask them to match the printout of the task to the list of tasks and give you the code.

On YouTube at <http://www.youtube.com/watch?v=u76tW-ne-yY> is a video of game play.

Technical Problems with the Game

If you encounter a problem with the game, please do the following:

1. Use the Firefox web browser.
2. If the problem is a time penalty connected with a Garrison or Oracle card, wait and then start playing again.
3. Refresh the game page. Is the problem fixed?
4. Do not click on the Firefox browser's "Back" button, instead, click on navigation links inside the game.
5. Trying logging off and logging back on to fix the problem.
6. If the problem totally prevents you from playing the game, email Professor Karen Markey (karen.markey@umich.edu), telling her your group name and describing the nature of the problem.
7. If the game exhibits unusual behavior that does not prevent you from playing, click the "Submit Bug Report" link on the top left and describe the problem.
8. If you cannot view buttons or the text of questions, increase screen real estate by choosing "View" and closing unnecessary bars.

 Choose a team name: _____

NAMES	EMAIL ADDRESSES
1.	
2.	
3.	
4.	

Please email me this information at karen.markey@umich.edu putting "SI 110" in the SUBJECT line. We will email you your team's name and password so you can start playing on Thursday, November 1.

APPENDIX P. EMAIL CORRESPONDENCE WITH TEAMS

Please use this information to sign onto the *Defense of Hidgeon, The Plague Years* game at <http://storygame.si.umich.edu/>

Team name: blue

Password: XXXXXXXX

Playing the Game

To play the game, go to <http://storygame.si.umich.edu/> and enter your team's name and password.

Only one team member can be signed onto the game at one time so consider dividing up game-play tasks among your fellow team players.

If you are sent to the Hospital, print the text that describes the exact task you must perform and take it with you to a U-M Library. When you finish the task, ask the librarian for a pass code. If the librarian cannot find a pass code, tell them to look for the pass codes (1) in a notebook, binder, or reference Wiki that contains library news, instructions, bulletins, etc., (2) in an email message from their library reference supervisor, or (3) at Ask them to match your printout of the task to the list of tasks and give you the pass code.

Technical Problems with the Game

If you encounter a problem, please do the following:

1. Use the Firefox web browser.
2. Do not click on the Firefox browser's "Back" button. Click on navigation links inside the game.
3. The problem may be a time penalty connected with a Garrison or Oracle card. Wait a few minutes and then start playing again.
4. Refresh the game page to fix the problem.
5. Trying logging off and logging back on to fix the problem.
6. If the problem totally prevents you from playing the game, email Professor Karen Markey (karen.markey@umich.edu), telling her your group name and describing the nature of the problem.
7. If the game exhibits unusual behavior that does not prevent you from playing, click the "Submit Bug Report" link on the top left to report and describe the problem.
8. If you cannot view buttons or the text of questions, increase screen real estate by choosing "View" and closing unnecessary bars.

Thank You for Playing the Game

Thank you for playing *Defense of Hidgeon, The Plague Years*. We are very much interested in your game-playing experiences especially your suggestions for improving the game.

