Viral Resistance

An Information Literacy Game

Independent Study
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<u>Overview and Goals:</u>

This Independent Study was designed to extend the spring 2017 project, Viral Resistance, from The Role of Technology in 21st Century Education (05-838) course. The goal of the summer independent study was to design the first level and story arc of a game that uses embedded design to teach players to think critically about information presented by the media, in particular through social media.

As previously outlined, the following project milestones were completed to achieve the goals of this Independent Study:

Game development will consist of:
1. Narrative writing
2. Game mechanics design
3. Graphics design
4. User testing
5. Working prototype

The research study will consist of:
1. Study design
2. IRB submission and approval
3. *Player recruitment**
4. *Data analysis**
5. Written report

*Actual implementation of the research study will not take place until after the independent study.

<u>Game Design: Learning Goals</u>

The first level of Viral Resistance is designed to introduce players to the process of reviewing news stories. There are many different elements to a news story, and two major ways a news story can be deemed untrustworthy are evidence of bias and lack of evidence to support claims. The first level of Viral Resistance focuses on bias and lack of evidence to narrow the scope of learning goals. The following learning goals are:

1. Knowledge: Identify key elements of a news story including source, author, argument/claim, and evidence
2. Knowledge: Understand and be able to identify bias
3. Skill: Analyze author of news story for bias
4. Skill: Analyze claim/argument for evidence (no evidence, contradicting evidence, etc.)
5. Skill: Draw a conclusion about the reliability of a news story
6. Skill: Apply appropriate argument(s) to justify decisions about news story reliability

The instruction and assessment design for each learning goal can be mapped onto the game.

	Instruction	**Assessment**	
Knowledge: Identify key elements of a news story as source, author, argument/ claim, and evidence	Through scaffolding in Modules 1 and 2 - player is led to look at certain elements in a news story.	In Module 4, they are given the chance to decline to investigate news. Assessment will be based on if they choose to investigate or not.	In the post survey, players will be asked to identify elements of an article that are important to identify reliability (choose all that apply). Assessment based on answers to that question.
Knowledge: Understand and explain bias	Module 1, begins with a dream involving the player experiencing negative results of bias.	In Module 4, players are asked if Anthony shows bias. Assessment based on that answer - they should not identify bias.	The post-survey also asks players to define bias. Assessment based on comparing that answer to a correct definition.
Skill: Analyze author of news story for bias	Module 1 introduces the idea of bias through the narrative. The narrative also includes an internal monologue from the main character that provides hints.	Module 2 has players assess the author for bias. Assessment based on that answer - they should identify bias.	Module 4 asks players to identify if Anthony has bias. Assessment based on that answer - they should not identify bias.
Skill: Analyze claim/argument for evidence (none, contradicting, etc.)	The player encounters short prompts encouraging them to "investigate" and look for evidence.	In several modules, claims made by the author of the news story have or not not have evidence. Assessment is based on player answers to those questions - they should correctly identify existence or lack of evidence	In Module 4, players are given the option to ask for evidence to back up a story or not. Assessment based on that answer - they should choose to always ask for evidence.

Skill: Draw a conclusion about the reliability of a news story	The player is walked through the process of analyzing elements of a news story and then drawing a conclusion from that.	At the end of each module, the player make an overall conclusion about the news story's validity. Assessment is based on a logical conclusion from the arguments created about each element of the news story.
Skill: Apply appropriate argument(s) to justify decisions about news story	Each module walks players through the creation of arguments. At the end of each module, players are walked through how to present those arguments to support their final conclusion.	Whether a player correctly identifies a news story as trustworthy or not, they need to provide arguments that support their conclusion. Assessment based on aligning their decision (trust or not) with arguments that support that conclusion (e.g. trust because evidence).

Game Design: Narrative

Our previous research during the Role of Technology in 21st Century Classrooms course shows three main reasons a fictional narrative game is the most viable option to teach media literacy: (1) consumers are not **predisposed** to evaluate the credibility of content, (2) they largely lack the **skills** to do so, and (3) attempts to address this problem head-on are met with **pushback** for a number of deeply-rooted psychological reasons (Viral Resistance: Final Report, The Role of Technology in 21st Century Education, 2017). In conclusion, we found a narrative game that uses embedded design would be the optimal solution because: (1) game content can be **intermixed** so players will choose to play the game without knowing it is educational, (2) the game will provide players with **practice** to gain skills fluency, (3) and the narrative allows for enough **distancing** so players do not feel pushback to game content due to their own biases.

After selecting a narrative solution, we tested story themes, with two that emerged as preferable for players in our target audience: (1) a gritty, detective, mystery game and (2) a futuristic, science adventure game. This version of Viral Resistance chose to blend the past two themes

to create a near-future, mystery game with a scientific content domain (in this case, biology and health). Research was done to find some emerging technologies used in the health and wellness fields. Bioinformatics and "wearables" are both new trends dealing with the collection and analysis of biological information, and are distanced from contemporary political narratives, in order to minimize bias in players. As a result, the following narrative was developed:

> In the year 2039, you own a small restaurant and find yourself encountering more and more news about research you did in another life alongside your sister. In this world, the government has mandated that all US citizens wear a sensor, called a BestU, that monitors their physical and mental health. You find out that (1) the BestU technology now allows people to be "health coaches" and report if they see anything out of the ordinary, (2) people can now be admitted to Health Oasis centers for mental health issues (3) a new reality TV show has been created that shares people's time at the Health Oasis centers, and (4) *supposedly* the BestU technology has been rigged to display false data. Players must make sense of this world by critically analyzing news and making decisions about what to believe.

Game Design: Final Prototype

The final prototype of the Viral Resistance game was created using Adobe Captivate and designed to be played on a tablet or mobile device. The game is segmented into four chapters, or learning modules, and played in sequence online:

Chapter 1: Familiar Echos
- News Media Type: Online Article
- Number of Argument Builds: 3
- Research Components: Intermixing and Embedded Feedback

Chapter 2: Blood and Water
- News Media Type: Radio
- Number of Argument Builds: 2
- Research Components: Intermixing and Explicit Feedback

Chapter 3: Lost Connection
- News Media Type: TV Interview
- Number of Argument Builds: 2
- Research Components: No Intermixing and Embedded Feedback

Chapter 4: New Beginning
- News Media Type: In-person Interview
- Number of Argument Builds: 2
- Research Components: No Intermixing and Explicit Feedback

The game aesthetics are inspired by comic books and narrative and dialogue focused digital games. For this independent study, more focus was put on game mechanics and research study design, so the graphics are left as more simplified vector-based characters and objects.
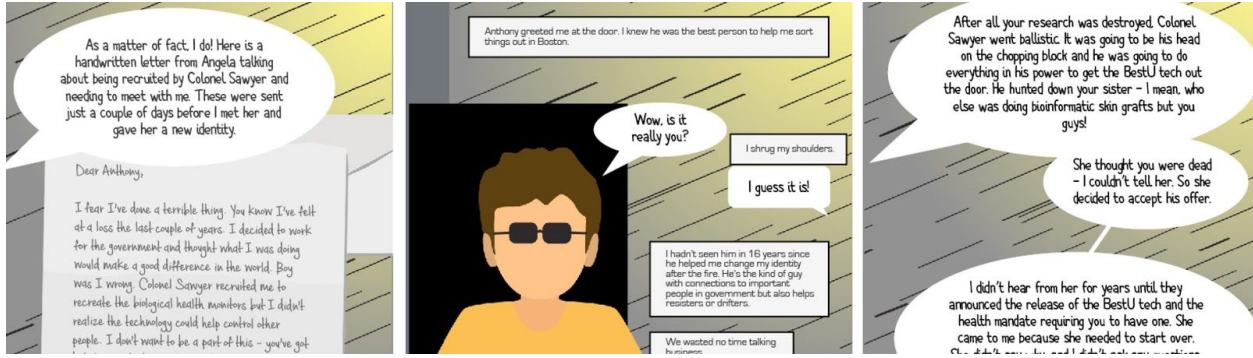
A text-only version of the first module was tested using Twine to gather early feedback about the game mechanics, fictional narrative, and assessment of decisions.

There were three big takeaways from the Twine prototype:
1. Players are sensitive to tense, character identity, and chronology of events
2. Players do not mind the game mechanics of constructing an argument
3. Players have to do a lot of assuming when identifying "facts" about a fictional world

As a result, the following changes were addressed in the final version of Viral Resistance:
1. The narrative was edited to have consistent past tense for dreams/memories and present tense for remaining content, first person narrative was used and no name, gender, or demographic identifiers were established for the main character (player), AND dates and locations were added to help players make sense of the chronology of events.
   a. For example, in Module 2, the narrative begins with a date and location and uses past tense for the memory sequence, then transitions to a future date and location, and uses present tense and first person narrative for on-task game play.
2. The 3 stage "argument building" game mechanic was used as a model for each encounter with a piece of news (e.g. article, interview, radio, etc.)
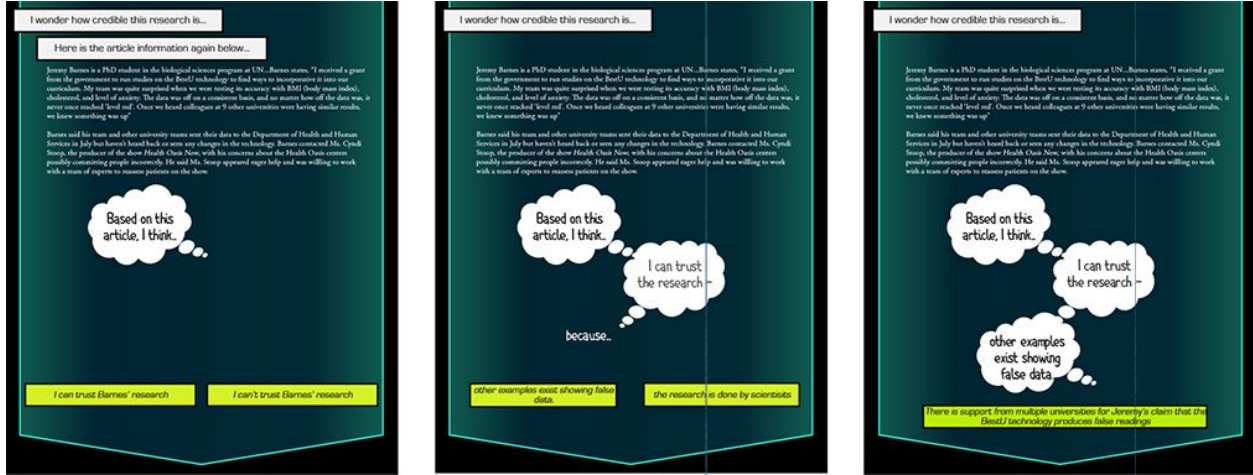
3. The "correctness" of decisions is focused on logic and critical thinking over biased, emotional opinions. The biggest obstacle creating the narrative was trying to write "true" and "false" content about a fictional world (trying to write something that is fake about a fake world was often confusing to wrap your head around!). As a result, knowing what is true or false about the fictional world is less of a concern and not assessed. What is assessed is whether a player used logic and facts to support their conclusion or opinions.

    a. Each "argument build" helps players draw a conclusion about elements of a news story. Each decision point has one option that is rooted in logic and facts and the other rooted in bias possibly held by the player. For example, Module 2 has players investigate the author's bio for a news story about the Health Oasis centers. The author is described as wealthy, but also shown to have investment in the success of the centers he is writing about. The logical conclusion is to see the author has bias about the Health Oasis centers. However, the alternative choice is to find he is untrustworthy because he is wealthy. People can hold the belief that wealthy people cannot be trusted, and drawing that conclusion would be assessed as incorrect.

Research Design: Details

Currently, the research proposal has been approved by CMU's IRB and can begin testing the game once everything is finalized. A participant of the study will complete the following actions:
1. Complete online consent form (5 minutes)
2. Play all four chapters of the game (30- 45 minutes)
3. Complete a post-game survey (10 minutes)
4. *Optional: Players can choose to also participate in a follow up survey a week later (10 minutes)*

Research Design: Hypothesis

This independent study aimed to investigate embedded design as a framework for creating educational games. We focused on two aspects of embedded design that better engage players in educational content: intermixing content and embedded feedback. We formulated the following hypothesis:

> Players will prefer educational game experiences where they have a variety of on- and off-task decision points and feedback that in not direct and explicit.

As a result, players will be more motivated to play an educational game that meets their preferences, and more engagement in that game means more practice with those learning experiences; high motivation and high engagement are a win win. Each chapter has a different composition of intermixing and feedback (the specifics were outlined previously in Game Design: Final Prototype).

Chapters that used intermixing required players to make decisions that were on-task (making judgements about new source) and off-task (general decisions about game narrative). Chapters with no intermixing only provided players with decisions that were on-task. Players were simply given a "continue" arrow not a decision point when they were asked to move along the narrative.

Chapters that used embedded feedback did not explicitly tell players they were right or wrong about a decision, and instead altered the game to have a positive or negative outcome if players were correct or incorrect about their overall assessment of the news story. Chapters using explicit feedback gave clear feedback to the player about the correctness of their overall assessment of the news story.

Research Design: Quantitative and Qualitative Data Collection
Data is collected in two ways: quantitative log data recording the in-game decisions players are making and qualitative, self-reported, post-game survey data about the game experience and players' personal engagement with news in the real world.

The game is designed to collect decisions at four major points during their engagement with a news story (image examples from Module 1 below):
1. Do you trust this aspect of the news story? [choices are: Trust, Not Trust]
2. Why do you trust or not trust that aspect of the news story? [choices are: "logical reason" and "biased opinion"]
3. Do you trust or not trust the overall news story based on your conclusions about different aspects of the news story? [choices are: Trust, Not Trust]
4. What arguments do you have to support your conclusions? [choices are: whatever the arguments were that were generated from investigating each aspect of the news story]
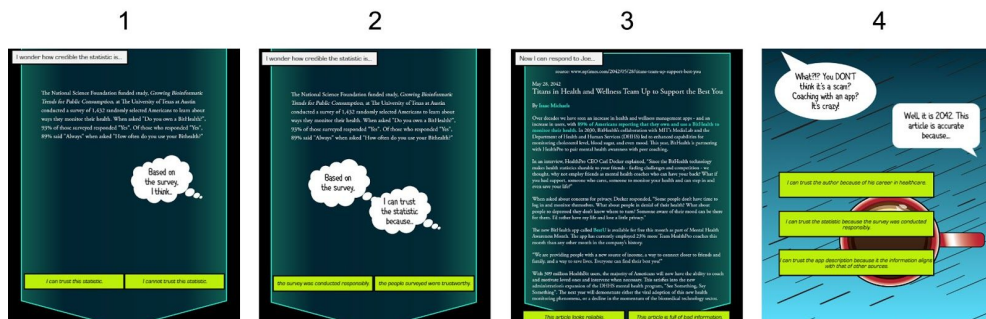
But we also are collecting ALL decision points, even off-task, if they become relevant. The following learning goals are mapped to the four decision points above:
1. Analyze claim/argument for evidence; Analyze author of news story for bias
2. Analyze claim/argument for evidence; Analyze author of news story for bias
3. Draw a conclusion about the reliability of a news story
4. Apply appropriate argument(s) to justify decisions about news story

The post-survey is designed to assess their learning, collect opinions about the game experience, and document their engagement with news in the real world. Five questions in the survey aim to assess their learning:
1. What would you do to find out whether a news article was trustworthy?
2. How do you decide if a news article on social media is trustworthy?
3. What parts/elements of a news story are important when judging its reliability?
4. Define bias:
5. Describe an example of bias from the game Viral Resistance:

Two learning goals are mapped to those questions, which are not able to be assessed based on game play alone:
1. Identify key elements of a news story as source, author, argument/claim, and evidence
2. Identify key elements of a news story as source, author, argument/claim, and evidence
3. Identify key elements of a news story as source, author, argument/claim, and evidence
4. Understand and explain bias
5. Understand and explain bias

The remaining survey questions help us track:
1. player engagement with news media in the real world (e.g. How often do you share news content with others?)
2. player motivation and preference in the game (e.g. On a scale from 0-10, how likely would you continue this game?)

Independent Study: Lessons Learned
We learned so much through this process; not just learning new software and applications but also about research study design. We overcame two main obstacles:

Project Scope: The original scope in the IS proposal included writing a narrative (essentially a short story), designing and implementing a digital game, and completing a research study with data collection and conclusions. Even with two group members, tackling the narrative, game design, and research design would have been better with a team working on each individual component. We are very proud of what we accomplished in this short amount of time and look forward to continuing the project. We now have experience with this type of work and can make better judgements about how much we can accomplish individually within an allotted timeframe.

Technical Issues and Software: We ran into a few issues while learning Adobe Captivate. Setting up data collection has been our main struggle, as well as learning a new software. Our files are not as efficient as they could be because we were learning new techniques as we were designing. Also, Captivate is designed for much more straightforward online learning experiences (i.e. traditional e-learning question types), and we were attempting a complicated "choose your own adventure" experience with limited programming skills. We both have valuable, marketable skills that we can carry forward the next time we approach designing with Captivate.

<u>Independent Study: Next Steps</u>
Courtney will be taking a game writing course and Samantha will be taking a data analytics course in the fall. We would like to implement this study as soon as possible but are also looking at the opportunity to continue building on this project in our next courses. This is also a good opportunity for Courtney and Samantha to switch roles because Courtney worked predominantly on technical implementation and Samantha worked predominantly on the narrative.

We also look forward to publishing our work and want to be thoughtful about the integrity of the study. We will continue to look at connections to other organizations, conferences, and projects where we can collaborate to better approach media literacy education.