Lab 1 – ReasonED.io Product Description

Areeb Nabi

CS 411 Professional Workforce Development II

Professor Thomas Kennedy

27 March 2024

Version 2

Table of Contents

Listing of Figures

Listing of Tables

1 Introduction

Given the abundance of information available on the internet in the modern digital age, critical thinking abilities are more crucial than ever. However, with plenty of material available online, a significant societal problem emerges: many misconceptions, inaccurate pieces of information, and a lack of emphasis on critical thinking are prevalent.

Figure 1 shows a social media post which illustrates a fallacy in reasoning known as the causation fallacy in a social media post criticizing the actions of an American Airlines flight attendant. When someone believes that something happened because of another thing, they are committing the causation fallacy. The passenger is claiming that impolite staff members are the cause of the airline's downfall.

However, verifying that impolite staff were the reason for American Airlines' bankruptcy is impossible without doing the necessary research. A claim like this can seriously damage the reputation of someone or something, as people lacking the necessary critical thinking abilities might share this false information without conducting their own research. This post has been shared over 2,100 times, demonstrating the extent to which fallacies can spread.

Figure 1: Causation Fallacy

2 Product Description

ReasonED.io is set to become a platform for game-based learning, focusing on enhancing users' ability to identify logical fallacies through age-appropriate games. The website will feature distinct collections for elementary, middle, high school, and adult users, all with the goal of introducing and refining logical fallacy identification skills. The challenges and approaches will be tailored to each age group.

Among the game series hosted on the website is one where each game revolves around a personified logical fallacy represented by a character with a unique quirk. These characters face various disagreements which the players must resolve by choosing the valid response while avoiding the logical fallacy. The games are catered to elementary, middle, and high school students, with adjustments to scenario complexity and responses. Examples of some of the games include Straw Manny, Hasty Harry, and Slippery Slope Sadie.

Straw Manny is a knight who needs better training. He practices combat on fake straw men, making him less skilled. Players guide Manny to attack real opponents, teaching the "straw man" fallacy. Hasty Harry is always in a rush. He needs help collecting puzzle pieces before completing the puzzle hastily, illustrating the "hasty generalization" fallacy. Slippery Slope Sadie is known for jumping to extreme conclusions, so she must be guided down a winding path without slipping into pitfalls, introducing the "slippery slope" fallacy.

Even though the concepts and scenarios are simplified for younger ages, the purpose of these games is to instill critical thinking and create the recognition of flawed reasoning. The memorable fallacy characters serve as guides in this educational journey.

2.1 Key Product Features and Capabilities

ReasonED games will be easily accessible directly on the website, eliminating the need for logging in or downloading. Free sign-up will be available. The games will be carefully tailored for elementary, middle, and high school levels while supporting year-long and continuous learning across all grades. This approach provides educators with a valuable tool for fostering critical reasoning skills over an extended period, extending beyond individual subjects. In-game tutorials will be included, and text-to-speech options will enhance accessibility.

The website will also feature readings introducing logical fallacies to each age group to offer concise background knowledge for users accessing the site independently. These readings will have text-to-speech options as well. Once whitelisted on school networks, the ReasonED website can be accessed by students during free time at school. Given the increasing integration of technology in lessons, ReasonED has the potential to gain exposure beyond school classes.

2.2 Major Components (Hardware/Software)

Users will engage with ReasonED.io through desktop and tablet browsers. The components currently in development include the website interface, the collection of games, and the available educator resources. The creation of these components involves the use of specific software tools.

For the back-end development, ReasonED will employ a Node.js web server, chosen for its scalability and flexibility. The games on ReasonED will be developed using the Godot engine, utilizing C# and GDScript as programming languages. Godot, being a powerful open-source engine for two-dimensional games, enables the creation of engaging game-based learning experiences directly within web browsers which ensures accessibility to a broad audience across various devices. The website will be hosted either on HostGator or 000webhost.

For the front-end development, ReasonED will utilize React which allows the creation of responsive and interactive user interfaces while enhancing the overall learning experience. For the database, PostgreSQL will be used as it is recognized for its reliability and performance.

For the development tools, version control will be managed through Git and GitHub as it provides a reliable way to track changes in the codebase. Trello will serve as a tool for task management, issue tracking, and milestone monitoring. JavaScript libraries like Mocha and Chai will be used to ensure code reliability through testing. The team's preferred integrated development environment (IDE) is Visual Studio Code, chosen for its smooth and efficient coding experience. Communication and coordination among team members will mainly take place through Discord and Zoom.

3 Identification of Case Study

This section delves into the target users, intended use, case study group, and future projections for ReasonED.io's implementation and impact.

3.1 Intended Users

ReasonED stands as a dynamic educational platform carefully designed to cater to a diverse range of users, going beyond standard educational limitations. The key beneficiaries of this platform are divided into two groups: Customers and End Users.

Customers:

- K-12 Schools: ReasonED intends to play a pivotal role in K-12 education by assisting educators in promoting critical thinking skills among students.
- Colleges and Universities: For these customers, ReasonED serves as a valuable additional resource to classroom learning, providing a gamified method to logical fallacy education.
- Educational Publishers: Educational publishers seeking innovative tools to enhance their offerings find ReasonED to be an in-demand resource.

End Users:

- K-12 Students (including Homeschoolers): ReasonED transforms the education of logical fallacies by offering an efficient and easily accessible learning experience.

- College Students: ReasonED is seen by college students as a supplementary tool to strengthen their comprehension of logical fallacies. Furthermore, it introduces an interactive layer through gamification to traditional coursework.
- Educators: Educators at all levels recognize ReasonED as a valuable resource as it offers an interactive and captivating way to improve logical fallacy education.
- General Public: Although primarily designed for educational institutions, ReasonED is intentionally shaped to be available to the general public.

3.2 Intended Use

ReasonED is designed with the purpose of delivering captivating and structured logical fallacy education to various educational stakeholders. It functions as an adjunct to standard classroom learning and presents itself as an interactive and gamified method to elevate critical thinking skills.

3.3 Case Study Group

Further improving the functionality and reach of ReasonED, the vision involves partnering with local schools to secure approval for integrating the platform into their educational systems. Through close collaboration with school administrators and educators, the goal is to seamlessly incorporate ReasonED into their curriculum as an invaluable resource for logical fallacy education.

3.4 Future Use

As ReasonED grows, a future is imagined where the user base expands beyond standard educational stakeholders. The platform welcomes lifelong learners, advocates of critical thinking, and those interested in the promotion of logic and reasoning. The aim is to develop a widely accessible and flexible tool for logical fallacy education while promoting critical thinking across varied user profiles and enhancing the education field.

4 Product Prototype Description

The prototype serves as a captivating depiction of the envisioned ReasonED platform. In addition, it gives stakeholders a hands-on experience of its main features. The prototype will function within a simulated environment and present a dynamic preview of the intended functionalities, interactions, and educational gamification. Table 1 provides an overview of the prototype compared to the real world product.

RWP vs. Prototype

Features & Functionality	RWP Features	Planned Prototype	Actual Prototype
PC & Tablet compatibility	✓	✓	
Characters+ Animations	✓	✓	
Accessibility Features	✓	Text-to-Speech	
Educator Tools	✓	Printable Graphics, Progress Tracking	
Paid Features	✓		
Games for k-12+	✓	1 Game Elementary, 1 Middle, 1 High School	

Table 1: Real World vs. Prototype

4.1 Prototype Architecture (Hardware/Software)

The ReasonED prototype architecture includes many modern hardware and software technologies that were carefully selected to deliver a cutting-edge user experience. Figure 2 shows the relationship between these different components and technologies. Here is a list of these technologies:

- Front-End
    - Framework: React
    - Languages: JavaScript, HTML5, and CSS
- Back-End
    - Web Server: Node.js
    - Languages: JavaScript, C#, GDScript
    - Engine: Godot
    - Database: PostgreSQL
    - Hosting: HostGator

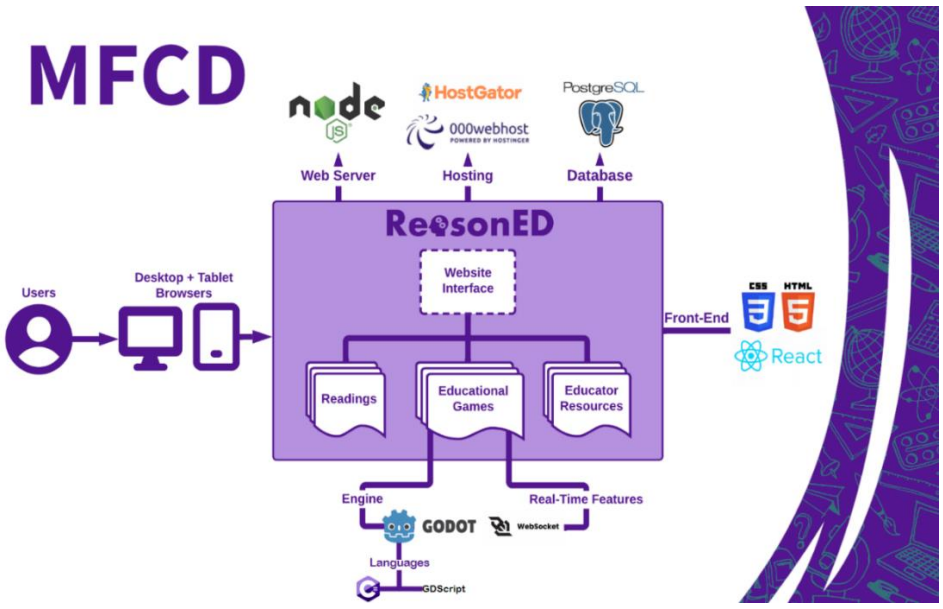

Figure 2: Multi-Functional Component Diagram

4.2 Prototype Features and Capabilities

The ReasonED prototype will consist of many features and functionalities that transcend traditional learning boundaries. Here are the key features and capabilities of the ReasonED prototype:

- At least one game for elementary, middle, and high school, respectively
- 2D Characters & Animations
- In-Game Tutorials
- PC & Tablet Compatibility
- Text-to-Speech
- Printable Graphics
- Progress Tracking

4.3 Prototype Development Challenges

During the ReasonED prototype development, some challenges are expected to emerge in its features and capabilities. They include:

1. **Technical Compatibility**: Technical Compatibility poses a challenge in dealing with the diversity of devices and operating systems. Achieving a uniform and enhanced user experience across a range of PCs and tablets, each possessing distinct specifications and screen sizes, will require thorough testing and adaptation.
2. **Characters and Animations**: Creating a variety of characters with interactive animations necessitates overcoming animation complexity related obstacles. A major priority will be striking a balance between interactive elements, visually appealing content, and device compatibility.

3. **Accessibility Integration**: Developing a Text-to-Speech function that may be customized presents difficulties in meeting the needs of a wide range of user preferences. A problem in design and development is finding the ideal balance between customization possibilities and a smooth user experience.
4. **Educator Tools and Progress Tracking**: Creating educator tools that are both user-friendly and comprehensive in tracking progress is a challenge. A thorough understanding of the needs and preferences of educators is necessary to design user-friendly interfaces for tracking student progress and publishing graphics.
5. **Diversified Educational Games**: Maintaining consistency and diversity while creating educational games for various K–12 grade levels can be challenging. While having a seamless overall experience, each game should be customized to meet the unique educational demands of its intended audience.

It will take careful coordination between developers, designers, educators, and possible users to overcome these obstacles. Iterative development methods, user feedback loops, and continuous testing will be crucial in bringing the prototype up to ReasonED's standards.

5 Glossary

Confirmation Bias - A cognitive bias that involves seeking, interpreting, and remembering information that confirms one's preconceptions (American Psychological Association n.d.).

Critical Thinking - The ability to think clearly and rationally, understanding the logical connection between ideas and the ability to make reasoned judgements (American Psychological Association n.d.).

Fact-Checking - The process of verifying the accuracy of claims made in public discourse and journalism (Cambridge English Dictionary n.d.).

False Dilemma - A fallacy that presents a limited set of options as the only possible choices when there may be other alternatives (Excelsior OWL n.d.).

Logical Fallacy - An error in reasoning or a flawed argument that can make an argument appear valid when it is not (Nikolopoulou, 2023).

Misinformation - False or inaccurate information shared, often unintentionally, without the intent to deceive (Dictionary.com n.d.).

Disinformation - False information deliberately spread to deceive or mislead others (Dictionary.com n.d.).

Slippery Slope - A fallacy that suggests one small step will inevitably lead to a chain of related events, often with exaggerated consequences (Excelsior OWL n.d.).

Straw Man Argument - A fallacy that involves misrepresenting an opponent's argument to make it easier to attack and refute (Excelsior OWL n.d.).

6 References

American Psychological Association. (n.d.). *Apa Dictionary of Psychology*. https://dictionary.apa.org/critical-thinking

American Psychological Association. (n.d.). *Apa Dictionary of Psychology*. American Psychological Association. https://dictionary.apa.org/confirmation-bias

Bouygues, H. L. (2022, June). *Teaching Critical Thinking in K-12: When There's A Will But Not Always A Way*. https://reboot-foundation.org/. https://reboot-foundation.org/wp-content/uploads/2022/07/Reboot-White-Paper_NAEP-5.pdf

Cambridge University. (2019). *Critical Thinking Teacher Survey*. Cambridge University Press & Assessment. https://www.cambridge.org/us/cambridgeenglish/catalog/skills/unlock-2nd-edition/product-details/teaching-critical-thinking?utm_source=wobl&utm_medium=blog&utm_content=woblcontent&utm_campaign=unlock

Dictionary.com. (n.d.). *Disinformation definition & meaning*. Dictionary.com. https://www.dictionary.com/browse/disinformation

Dictionary.com. (n.d.). *Misinformation definition & meaning*. Dictionary.com. https://www.dictionary.com/browse/misinformation

Echales, M. Hope. (2017, December 14). Identifying Flaws in Your Twitter Feed: A New Frontier in LSAT Preparation. Blueprint Prep Blog. https://blog.blueprintprep.com/lsat/identifying-flaws-in-your-twitter-feed-a-new-frontier-in-lsat-preparation/

Fact-checking. FACT-CHECKING definition | Cambridge English Dictionary. (n.d.). https://dictionary.cambridge.org/us/dictionary/english/fact-checking

Fallacy (n.). Etymology. (n.d.). https://www.etymonline.com/word/fallacy

False dilemma fallacy. Excelsior OWL. (2022, May 19). https://owl.excelsior.edu/argument-and-critical-thinking/logical-fallacies/logical-fallacies-false-dilemma/#:~:text=Sometimes%20called%20the%20%E2%80%9Ceither%2Dor,actually%20many%20shades%20of%20gray.

Khartite, B., & Hellalet, N. (2021). The Impact of Teaching Reasoning Fallacies on the Critical Thinking Ability of Moroccan Engineering Students: The Case of ENSAM Meknes. International Journal of Linguistics, Literature and Translation, 4, 222-232. https://doi.org/10.32996/ijllt.2021.4.9.23

Nikolopoulou, K. (2023, October 9). *Logical fallacies: Definition, types, list & examples*. Scribbr. https://www.scribbr.com/fallacies/logical-fallacy/

Slippery slope fallacy. Excelsior OWL. (2022, May 23). https://owl.excelsior.edu/argument-and-critical-thinking/logical-fallacies/logical-fallacies-slippery-slope/

Straw Man Fallacy. Excelsior OWL. (2023, September 19). https://owl.excelsior.edu/argument-and-critical-thinking/logical-fallacies/logical-fallacies-straw-man/

Wardle, C., & Derakhshan, H. (2017, September 27). INFORMATION DISORDER: Toward an interdisciplinary framework for research and policy making. https://tverezo.info/wp-content/uploads/2017/11/PREMS-162317-GBR-2018-Report-desinformation-A4-BAT.pdf