

Group #11

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AlgoRealm: A Hero's Odyssey

Executive Summary:

Algorithms drive excessive social media use, with kids and teens being more vulnerable to excessive doom scrolling (Weinstein et al., 2023). Usually, this age group is unaware of how algorithms work and the biases they perpetuate in the digital world. Thus the key issue is ensuring young people's understanding of how algorithms operate behind digital media platforms to prevent excessive scrolling and overconsumption. Research indicates social media use typically starts around the age of 14. Therefore, our project targets middle school students in the United States.

Our mission is to support middle school students in developing digital competencies to combat the trends of overconsumption and algorithmic biases. The aim is not to create fear about the presence of digital media in young people's lives. Instead, it is to help them understand the impact of their decisions when they navigate these sites. To transform negative media consumption into a positive and healthy activity, we plan to gamify a curriculum that educates teens and tweens on how algorithms operate behind social media platforms and the potential risks if not treated with caution.

We have designed a video game, AlgoRealm, that introduces the skills and competencies that young people will need to begin interacting with social media in a safe and informed way. By embedding the learning into gameplay, we hope to reach the target audience in a format that feels both familiar and enjoyable. The story-based fantasy game will guide players through increasingly difficult and more complex levels. Each one of them will target an important skill for social media literacy. The player will step into the role of hero of the game, leading the way to enlightenment for other dwellers of the digital realm. The game will include a caregiver guide, which will provide overviews of the lessons learned and conversation prompts for discussions with their children. In addition to the video game, AlgoRealm includes an interactive face-to-face component, which comprises an augmented reality (AR) app and an in-person immersive experience that allows caregivers and teens to engage with the game in real-world

settings. The game will also be promoted through the social media platforms this age of children are using the most - YouTube and TikTok.

After playing our game, we expect our users to be prepared to enter the world of social media equipped with mastery of how algorithms work, how to critically evaluate online content, protect their privacy online, and create positive connections with peers.

Mission Statement:

In recent years, social media has shifted from a friendly space to instead a marketing tactic for never-ending consumption. Children are being given smartphones at younger and younger ages, with free reign over the use of it, with 95% of youth ages 13-17 reporting use of a social media platform, and 40% ages 8-12 (The U.S. Surgeon General's Advisory, 2023). It has been found that "adolescents who use social media more than three hours per day face twice the risk of experiencing poor mental health outcomes," which is an easy target hit by most (The Annie E. Casey Foundation, 2023). For reference, the "healthy" amount of time engaged on social media is considered approximately 30 minutes a day (Sudhakaran, 2021).

There are little to no regulations in place for determining what content a user should see, especially a child. In a report from Center for Countering Digital Hate, they found that users could be given content related to suicide within three minutes of downloading TikTok, and in the next few, content promoting eating disorders (Murphy, 2023). The issue with the current algorithm system is that if the user is already depressed and anxious and viewing content around that subject, the algorithm will just keep feeding more and more of that content and thus feeding the difficult emotions (Murphy, 2023). The platforms are also aware that it is in our nature to pay longer attention to content that generates negative feelings, and use this to their advantage (Murphy, 2023).

The results of this social media addiction can lead to insomnia, increased anxiety, depression, conflict, and even the use of devices in dangerous settings such as driving (Hurley, 2022). Furthermore, in a more recent sense, it has deteriorated the exploratory sense of a child, leading to the end of discovery. With the algorithm spoon feeding the child anything they could possibly want, there is no need for a child to have the curiosity to investigate a subject on their own.

There is an increasing concern with the mental health effects of social media on children and teens in the US. As of October 2023, over thirty-three states are suing Meta (parent company of Instagram and Facebook) for knowingly hosting platforms that are designed with psychologically manipulating features to entice "young users' compulsive and extended use" (Kang & Singer, 2023). Overconsumption is prevalent on social media, and adolescents can be vulnerable to it. More specifically, adolescents of lower-income backgrounds are more likely to report addictive behaviors with social media (McGill University, 2022). Some current solutions to this problem include the bill *Protecting Kids on Social Media Act*, which has had controversy for the government deciding when kids can and cannot use social media, instead of the parents (Cope et al., 2023). While platforms have proved to be damaging to children, is banning them completely the right solution?

In light of these concerning trends, it is evident that there is a pressing need to address the adverse effects of social media on our youth. The unrestricted exposure of adolescents to unregulated content, coupled with the addictive nature of these platforms, is not only exacerbating mental health issues but also stifling their innate curiosity and ability to delay gratification. To counteract these negative influences, we decide to pivot towards empowering our youth with the tools and knowledge they need to navigate the digital world more safely and responsibly.

This leads us to our mission: to support middle school students in developing the digital competencies to combat the trends of overconsumption and algorithmic biases. By focusing on this age group, we can intervene at a crucial developmental stage, where children are increasingly exposed to social media, yet still formative enough to learn and adapt new habits and perspectives.

Our mission is not just about limiting exposure to harmful content; it's about equipping these young minds with the ability to discern and critically evaluate the information they encounter online. We aim to instill in them a sense of digital literacy that extends beyond mere technological know-how. It involves understanding how algorithms work and recognizing their biases, thereby enabling these young users to make informed decisions about their digital consumption.

Target Audience:

Considering the contextual influences between high and lower-income youth groups, the latter have a higher disadvantage in how they are socialized to technology and digital media. For example, children from lower-income households exhibit a considerable difference in screen media exposure, spending an average of 1 hour and 39 minutes more each day compared to their counterparts in higher-income homes (James et al., 2019). Further exacerbating this discrepancy is the correlation with parental education levels; in households with lower parent education, children tend to consume significantly more screen media, with a contrast of 2 hours and 50 minutes versus 1 hour and 37 minutes daily, representing a notable 1 hour and 13-minute distinction (Rideout & Robb, 2019).

Under this pervasive access to mobile devices and social network sites, 71% of parents in the United States have expressed a concern about their children spending too much time in front of a screen, and 45% of parents of children ages 5 to 11 rely on teachers for this type of information and advice (Auxier et al., 2020). However, the current landscape reveals a critical gap. Despite the prevalent concerns and reliance on teachers, there is a dearth of information available to both educators and parents to facilitate the development of critical thinking skills and digital competencies in children and adolescents.

A case in point is the initiative by Boston Public Schools, exemplified by the Office of Instructional and Information Technology. While this office is dedicated to providing essential technology infrastructure, support, and digital learning programs, it notably lacks a comprehensive curriculum designed to address the information and literacy gaps among parents and children (“Boston Public Schools,” n.d.). This underscores a pressing need for collaborative efforts between educational institutions and parents to equip them with the knowledge and tools necessary to support their children's healthy and informed media adoption.

The importance of an ecological approach becomes even more relevant in the context of tweens, as it becomes crucial to ensure they acquire the necessary knowledge and critical thinking skills before starting with social media consumption during their teen years. Recognizing that the median age of first social media use is 14 (James et al., 2019), our project is positioned as a proactive educational resource targeting middle-school students.

Acknowledging the existing gap in communication between educators, caregivers, and tweens, our primary objective is to integrate them into our comprehensive training strategy. By fostering collaboration among these key stakeholders, we aim to create a supportive environment

for tweens to develop the right dispositions and digital literacy skills. Furthermore, considering the limited emphasis on media literacies in the public education sphere, our project is specifically tailored to address this gap. Therefore, its primary focus is to cater predominantly to low-income families within the Boston Public Schools district.

Specific Objectives:

***Objective 1:** Raise awareness of how social media platforms use algorithms to funnel content to users.*

Young social media users have likely heard the term “algorithm” thrown around in relation to social media, but do not have a comprehensive understanding of the practical function. Many are unaware that they are receiving a curated stream of content, creators, and comments informed by every click, every like, every search they make. This may serve to perpetuate unhealthy behaviors and belief systems in young users without their knowledge. To address this concern, we plan to equip young consumers with the critical thinking skills to question the accuracy and representativeness of social media content as well as the messages they are receiving. We theorize that the more informed young people can be, the wiser they will be in online decision-making and social media consumption. By learning foundational knowledge about how algorithms work, we hope they will begin to recognize dangerous patterns in their own content streams.

***Objective 2:** Understand signs of problematic social media use and how to make online interactions positive.*

There are many ways in which social media use can become “problematic”, including overconsumption (even addiction), abusive behaviors (cyberbullying, grooming), and oversharing (private information, sensitive images). When used safely, social media can provide connection and community to young people, and we plan to encourage them to explore those positive methods of engagement. Many social media users do not recognize that what they do online has an effect in the real world. We intend to teach young people more about their digital footprint and the rippling impact their online behavior can have. By understanding the signs of more problematic patterns, we hope for young people to begin to moderate their own social media experience. In time, we hope this will give them tools to recognize when the messages

they receive in online content are attempting to manipulate them in some way (to buy a product, to engage with certain users).

Objective 3: Cultivate autonomy by learning how to critically evaluate online content and make independent judgments.

As children transition into adolescence, autonomy becomes an important part of their developmental process and psychological well-being (Rutledge, 2023). Having the ability to decide for themselves and gaining individuality is crucial as they learn how to navigate the world. In fact, research shows that imposing authoritarian restrictions on phone usage and privacy-invasive monitoring can negate the developmental needs of teens (Kang et al, 2022). It can result in backlash behavior, with teens making decisions without considering the risks for themselves or assessing the reliability of the content they consume. Therefore, we intend to cultivate teens' autonomy by teaching them to critically evaluate online content and make independent judgments. We hope to support teens to practice exploring a variety of perspectives on issues and thinking for themselves, rather than just accepting the views of influencers.

Objective 4: Be able to make wise decisions about digital media consumption and use digital media in a balanced, safe, meaningful way.

When utilized positively, social media can offer numerous opportunities for connection and learning. This is particularly beneficial for teenagers from marginalized groups who may lack supportive networks in their local areas. Therefore, instead of dismissing the importance of digital media in young people's lives, we hope to equip teens with the necessary tools and skills for balanced, safe, and meaningful social media usage. It is our goal to support teens to develop the ability to make wise decisions about digital media consumption, understanding when to disconnect and how to communicate effectively online. Additionally, we aim to empower teens to safely express their interests and values, and to create meaningful social media content. This way, they are prepared to be responsible netizens in our increasingly media-saturated world.

The Product:

AlgoRealm is an online game designed to teach middle school students in the Boston area about safe and healthy ways to engage in social media use. It is a story-based game that guides

players through an adventure in which they will learn more about the mechanisms that control social media content and the potential dangers of social media use. They will traverse a digital realm, gaining important skills for safe social media consumption and creation. Formative research revealed that most middle schoolers are already playing video games frequently, so our product brings the learning to a familiar and enjoyable format for the age group.

The Game will come with an accompanying caregiver guide, which will include an outline of each of the levels, highlighting the skills learned and vocabulary to use in discussions with their children. The guide will contain conversation starters for families to discuss healthy digital consumption, safe online interactions, and positive uses of social media. While caregivers may not have time or desire to engage with the game for themselves, this guide should provide tools for them to reinforce their children’s learning and have more meaningful conversations around social media literacy.

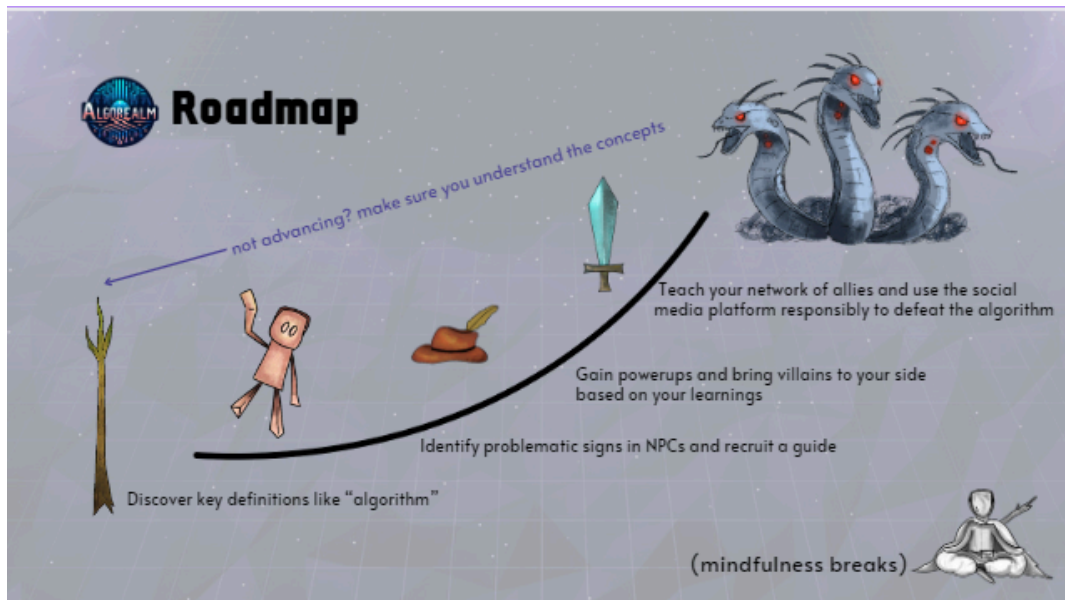


Welcome to the AlgoRealm. Our game invites players into a futuristic dystopian version of Boston, in which an evil entity known as The Algorithm has taken over society. The population is trapped in an endless doom scroll, misinformation abounds, and the only way for our hero to save humanity is by transforming destructive uses of social media into positive ones. Along the way, our player will encounter physical representations of unhealthy and dangerous online behaviors, with whom they will battle in order to bring them from the dark to the light. As they “defeat” their enemies, they become allies in the ongoing battle with darkness. To reinforce the concept that online interactions have a direct impact on the real world, every choice made in the game will alter the setting in some way. If they choose to engage in unsafe behaviors, the city will grow darker and the decay will worsen, but if they start to make wise decisions, the city will

continue its journey to light. Their job is to acquire the skills and tools to engage in positive social media use like community building, creative content production, and learning new skills. Because we don't want to push the narrative that social media use is inherently dangerous, we focus on transformation rather than destruction of enemies.

Game Outline:

We have included an outline of the storyline of the game, including key skills gained in each level. Each level will be increasingly difficult and complex, building off of skills developed in the previous level until the player faces a final boss, the Algorithm. Then, they will gain entry into an in-game social media platform, where they can experiment with their newly developed skills in a scaffolded and safe environment, with the potential of more storylines and realms to explore. Our levels will follow the framework of our objectives, moving players from awareness to mastery of critical thinking and self-regulation skills.



Level 1: Raise awareness of how social media platforms use algorithms to funnel content to users.

- Gameplay:
 - Players are introduced to the world of the game and begin to interact with NPCs, including a new companion, who will be their guide throughout the game. Their

companion will provide scaffolding around tools they are able to use to help them on their quest.

- Key Competencies:
 - Players will know what an algorithm is and how the data it is fed controls its output.
 - Players will understand that some online messages may be false or manipulated in some way.
- How to Beat the Level:
 - Collect information from around the AlgoRealm by interacting with NPCs and artifacts they find around the city. Some information will be accurate, other messages will be incorrect or misleading.
 - Complete a puzzle with facts about the algorithm using information found in the AlgoRealm. Only accurate information will unlock the next level of gameplay.

Level 2: Understand signs of problematic social media use and how to make online interactions positive.

- Gameplay:
 - Players will meet zombie-like NPCs who display various problematic signs of media use including overconsumption, cyberbullying, sharing of personal data.
 - Players will begin to save the NPCs and bring them to the light by teaching them about healthier uses of social media.
- Key Competencies:
 - Identify signs of different types of problematic social media use.
 - Identify positive uses of social media.
- How to Beat the Level:
 - Save one citizen of the AlgoRealm by waking them from their zombie-like doom scrolling.
 - Recruit your newly saved citizen to the cause by teaching them healthy ways to use social media.

Level 3: *Cultivate autonomy by learning how to critically evaluate online content and make independent judgments.*

- **Gameplay:**
 - Players will continue to enlighten and train more NPCs, bringing them into the mission.
 - Players are faced by a network of Spy Bots trying to gain intel on the resistance to report back to the Algorithm.
- **Key Competencies:**
 - Players will be able to evaluate online content more critically.
 - Players will understand what online privacy is and how much personal information to share online.
- **How to Beat the Level:**
 - Players will take down the Algorithm's spy network, transforming it into their own information network.
 - Players will begin to recruit and train their army for the final battle with the Algorithm.

Level 4: *Be able to make wise decisions about digital media consumption and use digital media in a balanced, safe, meaningful way.*

- **Gameplay:**
 - Players will use their new network to communicate and plan the uprising against the Algorithm.
 - Players will begin to interact with an in-game social network made up of NPC characters.
 - Players will create content for the social network, creating positive and uplifting messages to recruit more NPCs to the cause.
- **Key Competencies:**
 - Players will be able to use social media networks to create community and find allies online.

- Players will be able to use all previous skills with less scaffolding as they prepare to enter the real world of social media.
- How to Beat the Level:
 - Player will finally come face to face with the Algorithm and will need to use all the tools and weapons they have learned to transform the dark beast into a positive force in the world, thus freeing the citizens of the AlgoRealm.

Key Features:

Non-Player Characters (NPCs) – In our game, the NPCs are creatures now addicted to the social media platform of the realm. They will serve as the visual representation of using social media in an unhealthy way. One of them will serve as the sidekick with the hero to guide them on their journey and teach them healthy habits.

Attention Bar – instead of a “life” or “health” bar, players in the AlgoRealm will have an attention bar, reflecting the healthy amount of screen time for young users.

Mindfulness Breaks – built into the game, there will be moments for the player to decompress and take a step back from gameplay. There will be on-screen prompts for mindfulness activities, and players’ “attention” bar will be replenished more quickly as a reward for completing the task. They will see their character on the screen participating in the same activity. Over time, we hope this will build habits around mindful use of screen time and build up a toolkit of self-soothing mindfulness activities.

Power-ups – Throughout the game, players can earn power-ups by completing objective-related tasks or making wise decisions

- Example: Critical Thinking Cap - Players earn the power-up of critical thinking cap by successfully questioning the authenticity or motivation of messages they receive in the game. When they wear their Critical Thinking Cap, they receive a boost in attention and their actions are more powerful. When worn, the Critical Thinking Cap will also provide scaffolding around the kind of questions to be asking about reliability of sources of information.

Weapons – earned or built within the game, these weapons will represent real-life tools players can use to be more informed and critical consumers of social media

- Example: Stream Slicer - This weapon is designed to stem the stream of data that feeds the algorithm. In the game, there will be a physical representation of data being fed into the algorithm. By using the Stream Slice, players will be able to cut off the unconscious flow of information to make more intentional choices about what they share.

Personalized Avatars - Before gameplay begins, users will craft their characters by identifying interests, qualities, and abilities they personally possess or hope to develop. They will design a non-human avatar to represent them in the game, which will reflect those qualities rather than realistic physical attributes. We intentionally will not collect demographic data from players both for safety and to encourage an inside-out rather than an outside-in approach to character development. Players will follow their avatar through the AlgoRealm, watching the interactions from an outside perspective.

Setting - Our game is set in a futuristic dystopian version of the city of Boston. Familiar landmarks and geography will ground our players in this digital city. While familiar, the high-tech city will take on a dark and ominous quality. By setting it in their own city, we hope that players will be able to draw connections between life in the game and their real lives. The skills they will acquire through game play will be applicable in real-life situations, so by having the city in the game reflect the Boston they know, we will reinforce those implicit connections. This will also aid in future development of an AR app meant to engage young users and their caregivers by guiding them through activities related to the game in the context of real-life spaces. Reflecting the theme of our game, transforming dangerous and unhealthy tech habits into positive ones, the darkness and decay of the city will decrease as players move through levels. To drive home the concept that online interactions have a direct impact on the real world, every choice made in the game will alter the setting in some way. If they choose to engage in unsafe options, the city will grow darker, but if they start to make wise decisions, the city will continue its journey to light. The inspiration for how the game will look comes from other 3D, robotic, futuristic games.

*See appendix for renderings of characters

Face-to-Face Activities:

In addition to the video game, AlgoRealm also includes a face-to-face component. This interactive aspect comprises an augmented reality (AR) app and an in-person immersive experience that allow caregivers and teens to engage with the game in real-world settings. Both the AR app and the immersive experience aim to offer caregivers and their teens a shared learning experience where they can practice and talk about digital competencies together. Bringing the game's world to life in three dimensions, the AR app includes activities designed to encourage teens to practice autonomy and guide their caregivers through the digital literacy quest. For instance, to progress to the next game level, players will be asked to involve their caregivers in solving the challenge. Similarly, the in-person immersive experience will recreate the video game in an offline setting, encouraging partnership between the caregiver and teen.

We believe that developing an AR app and an in-person immersive experience for caregivers and their teens is an appropriate and effective response because it promotes parental communication and addresses the specific developmental needs of adolescents. As children transition into adolescence, their need for personal space and autonomy intensifies (American Psychological Association, 2023). Thus, monitoring teens online and imposing authoritarian restrictions can counteract these developmental needs (Kang et al., 2022). Instead of merely limiting screen time, caregivers should engage in open discussions with their teens about the impact of social media. This approach tends to foster healthier relationships between adolescents and technology (Rutledge, 2023). Understanding the value of parent guidance and teen autonomy in their digital well-being, we propose the development of an AR app and in-person immersive experience as part of the face-to-face component to enhance teens' digital competencies and resilience.

Formative Evaluation:

During our initial product ideation, we conducted a formative evaluation and used surveys to identify our target audience's interests. We surveyed teens aged 10-14 and received several responses that guided our product approach. We asked about their social media usage and preferred video games. From the responses, we found that video games are a primary source of learning and leisure for teens today. This indicated that to engage our target audience, we should

design our intervention in a format that interests them. This led us to the development of an educational video game.

Recognizing the significance of caregiver involvement in teens' digital well-being, we also distributed a version of the survey to caregivers. We found that while caregivers are highly willing to support and engage in digital literacy activities with their children, they have limited time and show little interest in video games. Despite understanding the need for caregiver participation, we gathered from the survey that our intervention must minimize the burden placed on caregivers and aid them in their own digital literacy learning. This led us to adopt a three-pronged approach: a video game for teenagers, a parent guide explaining our game design theories and key digital competencies, and an AR app to foster caregiver-child collaboration.

To continually improve our product, we'll use both behavioral and verbal data to guide our product optimization. We will invite a sample of players to play the introductory level of AlgoRealm, observing whether they remain engaged or stop after the required mindfulness break. Since teenagers are more capable of articulating their experiences and thoughts than younger children, we will also interview these users to gain feedback on their personal experiences with the game. We also plan to include a suggestion box within the game for additional user feedback. Furthermore, we value the input of caregivers on their children's learning and engagement with the game. Therefore, we intend to introduce a caregiver message board on our website and within our game. This will provide caregivers a platform to share suggestions, voice concerns, and ask questions about supporting their teenagers' digital well-being.

Outreach:

The plan is to reach the target audience in multiple forms with the product. This will allow for multiple points of entry and help word spread of our game. Ideally, not only children will be informed of its existence, but also parents, teachers, and communities.

Ironically, the very platforms that our game seeks to demystify will be instrumental in reaching our audience. Platforms like YouTube and TikTok, where our target audience spends a significant portion of their time, are ideal for our initial marketing campaigns. These platforms allow for creative and engaging advertising that resonates with the youthful energy and curiosity of middle schoolers. Social media apps such as YouTube and TikTok are two of the leading

platforms for teenagers today (Vogels, 2022). The approach is to create captivating ads that give a glimpse into the game's storyline and characters. For example, TikTok has a fast-paced and visually engaging nature, so having short, intriguing ads that highlight the fun aspects of the game, while subtly weaving in the educational elements, can create a buzz and drive interest. Meanwhile, the YouTube ads can be longer and go into more details since it is not as easy to swipe away an ad.

Another point of entry would be Steam - one of the largest digital distribution platforms for PC gaming. By featuring the game on Steam, we not only make it easily accessible to our target audience but also tap into a community of enthusiastic gamers who value both entertainment and educational content.

Lastly, for the future, the community will be directly involved. With the AR feature, this allows the game to be taken anywhere, including public spaces like museums and libraries, while also having the possibility of being directly in the classroom. The caregiver guide on the game would ideally evolve into more - functioning not only as definitions, but a lesson plan for people in the community to lead groups around the topic. By having programs around the community, the game will also be more accessible to our target audience children.

Partnership:

To really amplify our reach and maximize educational impact, there are a few strategic partnerships that will be key. The big and immediate partnership will be with Epic Games, renowned for their massively popular game, Fortnite. This partnership is pivotal for several reasons. First, Fortnite's player base largely overlaps with our target demographic of middle schoolers. By collaborating with Epic Games, we gain direct access to this engaged audience. Second, associating with a respected name in the gaming industry lends credibility to our product. It also ensures higher visibility among gaming enthusiasts. Lastly, through this partnership, we can explore cross-promotional activities such as featuring our game within the Fortnite ecosystem or bundling it with a Fortnite purchase. This allows us to not only introduce our game to a wider audience, but also presents it in a context familiar to them.

As we establish our presence in the market, our mid-term partnership strategy focuses on collaborations with popular YouTube gamers. These influencers have the power to sway opinions and drive trends among our target audience. Partnering with them allows us to tap into their loyal

follower base, and can further educate their audience about the social media algorithms in an entertaining way. These collaborations can also help in building a community of players who are not just interested in the game but are also keen on learning about social media's influence and implications.

Looking towards the future, our vision includes forming partnerships with educational institutions. This long-term strategy aims to integrate our game into educational curricula, making it a tool for learning and awareness. By incorporating our game into their teaching methods, educators can provide students with an interactive and engaging way to understand the impact of social media. Collaborations with educational institutions can also open avenues for research into the effectiveness of gamification in education, potentially leading to further enhancements and iterations of our game.

Impact Assessment:

In order to assess the impact of AlgoRealm on users, a comprehensive plan incorporating both quantitative and qualitative methods is essential. Pre-game and post-game surveys will serve as the cornerstone of this evaluation. Before engaging with the game, participants will complete a survey gauging their baseline knowledge on social media algorithms and their current digital habits, such as their screen time hours on certain apps such as Youtube, tiktok, and instagram. A corresponding post-game survey will measure any shifts in understanding and behaviors, thus providing a comparative analysis of the game's immediate educational impact. Beyond such quantitative measures, case studies of individual participants will allow for an in-depth analysis of the game's influence. By tracking a select group of users over an extended period, researchers can observe the longitudinal effects of the game on social media behavior and digital literacy. This approach will provide a narrative to the quantitative data, showcasing real-life applications and possibly unanticipated outcomes of game interaction.

Caregiver feedback is another pillar of the evaluation process. Parents and caregivers offer an external perspective on the observable changes in their children's digital behaviors. Surveys, interviews, and analysis of discussions on the caregiver message board will provide a multi-dimensional view of the game's social impact. Understanding caregivers' perceptions and the conversations sparked by AlgoRealm will also highlight the game's role in fostering family dialogues on digital literacy.

A longitudinal tracking strategy will be employed to measure the durability of the game's impact. Follow-up surveys at various intervals post-engagement will investigate the lasting effects of AlgoRealm on players' behavior and knowledge retention. Furthermore, continued monitoring of in-game engagement, especially if the game is updated with new content, will provide insights into the sustained educational value of the game.

In the execution process of impact assessment, privacy and consent are at the forefront; all data collection methods will adhere strictly to privacy laws, and consent will be diligently obtained from all participants and their caregivers. Cultural sensitivity will guide the adaptation of surveys and assessments, ensuring they are respectful and accessible to a diverse array of participant groups, thus enabling a wide-reaching and inclusive evaluation. To bolster the validity of the findings, control groups will be utilized where feasible, providing a comparative baseline that highlights the game's specific impacts.

In sum, the multifaceted assessment plan for "AlgoRealm" is designed to capture a detailed picture of the game's effectiveness. By employing a combination of surveys, analytics, and case studies, the evaluation will not only measure the game's impact but also inform ongoing improvements. Such a rigorous approach ensures that the game meets its educational objectives and continues to evolve based on solid empirical evidence. With privacy and consent as prerequisites, the assessment will respect participants' data integrity while striving to enrich their digital literacy—a skill increasingly crucial in the modern world.

APPENDIX

Key Terms

- **Algorithm:** A set of rules or a specific formula designed to perform a task or solve problems. In social media, algorithms are technical means of sorting posts based on relevancy instead of publish time, in order to prioritize which content an user sees first according to the likelihood that they will actually engage with such content (Golino, 2021).
- **Algorithmic Biases:** Due to the primary goal of algorithms to select information that boosts user engagement, they amplify the very information from which humans are biased to learn, regardless of the content's accuracy or representativeness of a group's opinions (Kulke, 2023).
- **Autonomy:** In the context of digital and social media usage, autonomy refers to the ability of individuals to have control over their digital choices, including the awareness and capacity to regulate their own media consumption.
- **Big Data:** High-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation (Gartner). Big data is often utilized in improving the efficiency and personalization of social media algorithms.
- **Blackbox:** A system or device whose workings are not understood or accessible to users. In social media, it often pertains to the opaque nature of algorithms and how they process and filter content.
- **Critical Thinking Skills:** The capacity to engage in reflective and independent thinking, allowing one to analyze, evaluate, and synthesize information, and to reason logically.
- **Content:** In the context of social media, content refers to any form of digital expression created and shared by users. This includes text, images, videos, audio, and interactive materials.
- **Digital Competencies:** A set of abilities to use technology to optimize our daily lives effectively, and the confident, critical and responsible use of the technologies from the society of information for work, entertainment and education (Zhao et al., 2021).
- **Feed:** A stream of content provided to a user on social media platforms, typically curated based on the user's interactions, preferences, and the platform's algorithm.

- For You Page (FYP): A feature particularly associated with TikTok, where the platform's algorithm curates and presents a personalized feed of content to the user, based on their past interactions and preferences.
- Phone Addiction: The obsessive use of a smartphone, which usually leads to sleep deficit, lower concentration, creativity blocks, anxiety, reduced cognition, stress, loneliness, insecurity, impaired relationships, etc. (Gomez, 2023).
- Screen Time: The amount of time spent using devices with screens, such as smartphones, computers, and televisions.
- Social Media/Platform: a website or internet medium that— (A) permits a person to become a registered user, establish an account, or create a profile for the purpose of allowing users to create, share, and view user-generated content through such an account or profile; (B) enables 1 or more users to generate content that can be viewed by other users of the medium; and (C) primarily serves as a medium for users to interact with content generated by other users of the medium (Trafficking Victims Prevention and Protection Reauthorization Act, 2023).
- Social Media Literacy: The knowledge and skills necessary to use and engage with social media in a balanced, safe, and meaningful way
- Trending/Viral: Content is said to be trending or viral when it rapidly gains popularity and is widely shared across social media platforms, reaching a large audience in a short time.
- Underprivileged: Refers to individuals or groups lacking in advantages, opportunities, and resources, often due to socioeconomic factors, which can include access to digital resources and education.
- Urban: Pertaining to cities or towns. In the context of digital access and literacy, urban areas often have better access to technology and internet resources compared to rural areas.

Game Design Sketches:

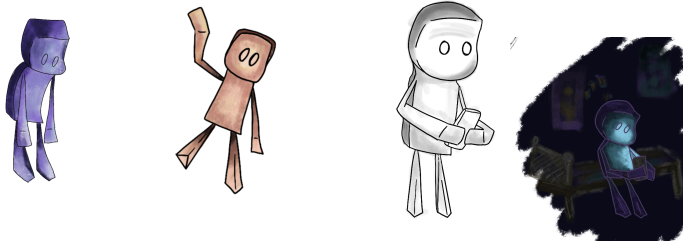
Setting



The Algorithm



NPCs



Our Hero



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