Design of a Social Media Simulator as a Serious Game for a Media Literacy Course in Japan

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Abstract: This paper introduces the initial phase of the design process of a simulator about information sharing in social media for educational settings. This online tool mimics real-world social media services and provides a playful learning experience. Players evaluate online information, make decisions to share or not the information, and as a result, gain or lose followers. Students can access other players' statistics and analyze references such as expert's opinions to support their decision-making. Through this experience, students are expected to exercise and reflect on their online social media behavior and become smart consumers and responsible creators of online information. The preliminary findings reveal a glance of social media sharing behavior among university students in Japan and clues for measuring the learning effects and the engagement for this sort of practice. Results from this research are expected to contribute to digital media literacy education and serious game design domains.

1 INTRODUCTION

Digital media technologies are developing at unprecedented speed, and the amount of information available on the internet increases exponentially. At the same time, it is hard for our skills to process and evaluate to keep up with this enormous amount of information that we are exposed to daily. One of the indicators is the spread of fake news online.

It has been said that the spread of fake news is related to age. The elderly shared nearly seven times as many articles from fake news domain than younger age groups (Guess et al., 2019). On the other hand, young people's ability to reason about information on the internet is low (Wineburg et al., 2016).

We have never had this volume of information in the reach of our fingertips, with just one touch of our smartphones. Although the importance of media literacy education is increasing, social media behavior knowledge is not reflected enough in related curriculums. Fact-check checklists have also been criticized in regards to their usefulness on current media literacy education settings. (Breakstone et al., 2018; Mimizuka. 2020)

This paper presents the design process of a serious game related to social media and fake news. It mimics a social media service, and users are expected to evaluate the information on posts and make decisions about sharing or not a post, and if sharing, choose between public or smaller groups. The main goal of this tool is to trigger self-reflection on students sharing behavior in social media. This game has been designed as one component of a media literacy course at a national university in Japan.

This serious game's design process comprises concept creation, development, and utilization of games as engaging, playful and informative tools. Understanding that the ability to consume online information shapes one's digital citizenship, the purpose of this game is to allow students to reflect on their behavior when dealing with information online. This is expected to stimulate students to think of their decision-making when consuming, creating, and sharing content on social media. Moreover, it stimulates students to engage in online participation.

This research aims to measure the outcomes of a digital media course designed for university students in Japan and contribute to the literature of media literacy education in the digital era.

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2 BACKGROUND

2.1 Media Literacy and Media Literacy Education

The spread of information and communication technologies (ICT) made information accessible to everyone with access to the Internet. This setting deeply impacted the way we work, learn, socialize, and made it easier for anyone to create media and online content. Nowadays, we are all exposed to an overwhelming amount of information online, making it difficult to understand messages and distinguish reliability.

The need to reconsider how we understand and interact with information and media has been reinforced by recent global events. Information literacy and the media shape the way one makes decisions and behaves toward social-political facts or events such as a pandemic.

Considering the high connectedness context in the current global society, media literacy has become a core competence in educational frameworks around the globe. Media literacy is "the ability to identify different types of media and understand the messages they're sending" (Common Sense Media, n.d.). It is directly related to topics such as 21st-century skills and digital citizenship.

Education frameworks presented worldwide show characteristics of strengthening the digital context of media literacy and stimulating students to creativity and expression. However, Japan still struggles to incorporate digital media related topics into the curriculum, despite the increasingly high internet penetration among elementary (around 85.6%) and junior high school (95.1%) students, including access from smartphones, tablets, and personal computers (Cabinet Office, 2018).

As described by Maekawa et al. (2020), "the goal of the course developed with this research is to bring the fundamental messages of media literacy education in a different approach to media literacy education practice at Japanese university classrooms." The course, as well as the components, were designed based on the fundamental pillars of learning competencies (knowledge, skills and attitude) as described below (Maekawa et al., 2020):

- Knowledge: Understand the dangers of simplifying and labelling information;
- Skill: Understand the key points to assess the reliability of the information;
- Attitude: Nurture responsible behaviour as a digital citizen.

The course comprises three modules:

- About Digital Media Literacy;
- Information and News Literacy;
- Behind the 'Like it' button.

Each module was designed to provide a blended-learning experience with video, online interactive activities, and group discussions.

The impact of the coronavirus in all levels of education made 97% of Japanese universities offer all courses online during the first half of the academic year (Digital Knowledge, 2020), with many still remote as of the first half of 2021. Because of that, the course structure, as well as all its components, were designed also for online, offline, or hybrid learning environments.

2.2 Serious Games in the Context of Fake News

Digital games are a part of daily life in Japan. In 2018, the number of game players in Japan was estimated to be 67.6 million (Newzoo, 2018), a number that represents more than half of the entire country's population. The popularity of digital games is often associated with engaging and meaningful experiences.

In education, their potential for interactive learning environments and collaborative learning experiences have been seen in the shape of serious games (Anastasiadis et al., 2018). The term serious games can be defined as "any piece of software that merges a non-entertaining purpose (serious) with a video game structure" (Djaouti et al., 2011). Serious games are also often seen used in conjunction with other terms such as edutainment, digital game-based learning, and immersive learning simulator (Alvarez & Djaouti, 2011).

Schifter (2013) highlights the connection between serious games and 21st-century classrooms with games as external motivators, for drills, practices, and other types of learning. Additionally, the games' virtual environments can represent a safe environment in which students can experience and experiment with their skills and knowledge (Anastasiadis et al., 2018). As such, games represent a safe zone to try new approaches and ideas, without real-world repercussions if they turn out to not be good. Failure itself can be seen as a step conducive to learning, which can help to initiate collaboration and dialogue between peers and provide learners with new insights (Anderson et al., 2018).

Serious games have been one of the ways utilized to work with the problems caused by fake news. Several games have been done utilizing different

approaches to bring awareness to the topic, such as: “Bad News”, where you play the role of a fake news producer and learn their techniques (Roozenbeek and van der Linden, 2019); “Fake News Detective”, in which you become a fact-checker in a hoax busting organization (Junior, 2020); and “LAMBOOZLED!”, a competitive deck-building card game to enhance news literacy skills (Chang et al., 2020). Each with their own approach, those games were utilized as ways to work with misinformation and news literacy.

Another game called “Factitious” utilizes data collection mechanisms to allow assessment of factors such as patterns in understanding news literacy and play experience (Grace and Hone, 2019).

In the next section, we will introduce the game Brain Company, designed in the Graduate School of Media Design, Keio University as a master’s project.

2.3 Brain Company

Brain Company (Mengyun, 2019) is a card game that aims to bring awareness about the dangers of fake news. It was designed around the concept that sharing fake news or not sharing reliable news can have real-life impacts.

Players score points by sharing reliable news and blocking fake news. If they share fake news or block trustworthy news sources, they lose points instead. Each news piece is associated with reference cards, which aim to give other perspectives on the information and aid the player in making a decision. The reference cards are designed to simulate a variety of sources, from reliable news sources to social media. It is up for the players to decide which of those references are to be considered trustworthy and help them to identify if the news is fake or not. The objective of associating each news with other sources is to show the importance of researching and filtering information before sharing online, as well as considering the sources where each piece of news or associated information comes from.

Players have a time limit to make their decisions on sharing or blocking for 10 different news cards. The playing part is a single-player, but the idea of Brain Company is to run multiple single-player sessions in parallel at once. This way, after the individual sessions are over, players can compare their scores and results with each other.

One unique aspect of Brain Company to other games about fake news is that it exemplifies to players how social, economic and environmental problems can be linked to their choices on contributing or not to misinformation. The impact can be seen immediately after the play session, giving players the possibility of establishing a causal relationship with their decisions on sharing or blocking pieces of news. Some of those scenarios are based on real fake news cases and others are fictional. When comparing their results, players can engage in conversations on how each of their scenarios might differ, raising many points for discussion.

The following image (Figure 1) shows an example of fake news included in the game, as well as the impact caused in society by the massive sharing or blocking of this news piece.

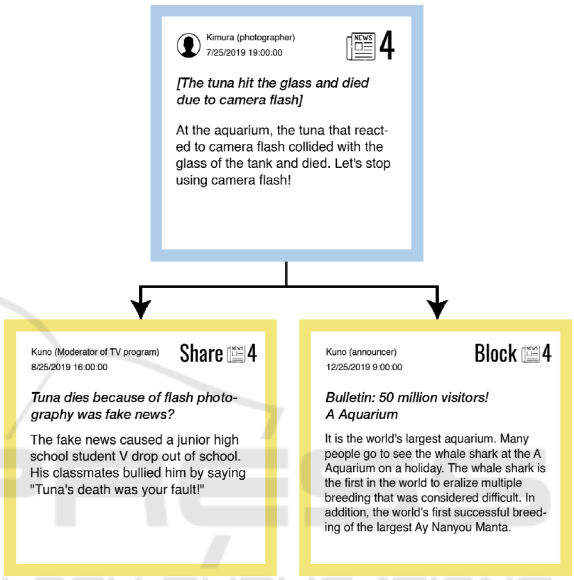

Figure 1: Results from sharing or blocking news in Brain Company.

In the case above, the information stating that the tuna died because of flash photography in the aquarium was fake news. So, if players share this information, the consequence is that a junior high school student who visited the aquarium and took photos with flash gets bullied by his classmates (and in this case, players lose points for sharing fake news). On the other hand, by blocking the fake news, players score points and the aquarium is not affected by misleading information, keeping its popularity as a visiting spot.

Brain Company's goal was to show those scenarios to players and allow them to reflect on the consequence of their actions online. Comparing before and after they play the game, test participants shifted their view towards the impact they have when they share news to be more cautious on the information they share, as well as on researching several sources to assess the reliability of news.

3 DESIGN CONCEPT

The game designed in this research is part of a higher education course on media literacy. This course includes time in the lecture for students to learn how to handle the online information around them through blended learning activities such as watching videos, classroom discussions, and the serious game described in this paper. To better understand the context, we describe the course core concept and how it impacts the game design process.

3.1 Media Literacy Course Concept

The core structure of the course (Maekawa et al., 2020) is also adopted in the game design, as described below.

- Knowledge: Understand the dangers of simplifying and labelling information.

There is a lot of information that cannot be classified as completely correct or completely wrong. In fact, there are grey areas in determining accuracy in fact-checking. The value of information varies with context, and even experts may disagree about its reliability.

- Skill: Understand the key points to assess the reliability of the information

Meta information like author and publish date is often useful for evaluation. Figure out what can be used as meta-information and what to pay attention to. In some cases, it is useful to estimate the intent of the publisher. Various reasons exist for publishing fake news, including revenue, propaganda, desire for approval, and misunderstanding.

- Attitude: Nurture responsible behaviour as a digital citizen

Proactive sharing of valuable information can lead to a wealth of information space, community development, and solutions to social problems. On the other hand, even non-malicious sharing can foster misunderstanding and discrimination. The term "information" is not limited to articles in the commercial media, but also includes UGC, as represented by social networks as well as corporate and government announcements and data.

3.2 Game Concept

Based on knowledge, skill, and attitude, the game aims to engage players through making decisions of sharing information on social media. The first action that players make is to evaluate information in a context that mimics real-world services. The user interface takes an SNS-like look by displaying card-type information and a timeline styled layout. The game also presents real articles and posts, so players can use them as references to base their decision making.

The second action players take is to analyse experts' opinions as part of how to read and understand information. In a real-life context, readers are influenced by opinion leaders and key persons related to a determined subject. It is also said that what others in their social circle do can influence one's opinion.

3.3 Game Experience

The original card game is a single-player game. However, it is meant to be played with more players simultaneously, as the results can be compared through a ranking system. In the setting of a workshop, comparing results between players can create an environment conducive for discussions and deeper analysis to take place.

As such, the new game experience based on Brain Company can be seen in two main parts:

- The first part is the individual play session, in which each player reads different news and references, deciding to share or to block the information. Each player's decision process is based on their interpretation of news and sources, related to their assessment of the reliability of each piece of information;
- The second part is the discussion session, in which players can compare their results and discuss the impacts of the news they shared and blocked, as well as discuss the importance of responsible behaviour as a digital citizen. In this part, players can see the overall session results, how players answered, and what type of scenario their choices created. The statistics of other players' choices, as well as the answers of specialists in the topic of the news are shown, adding extra elements for discussion.

3.4 Initial Digitization

To approach the digitization of the concept originated from the card game Brain Company, the first step was to digitize the original game. Initially, we converted the original game experience as is, without adjustments. However, the original version was not designed with specific course modules in mind. Consequently, missing features and opportunities for changing the design were detected.

The goal in this first step was building the same experience designed in the original game but in a digital medium. Some advantages from having the game in a digital version includes having pictures for each news to mimic a real article, providing a timer, adding soundtrack, saving session results, and linking different sessions with several participants in the same group through a code system.

The following picture (Figure 2) shows how each news is presented to the players, with blocking/sharing features, reference cards on the right side and meta-information.

Figure 2: Initial digitization of Brain Company.

3.5 Refinement based on the Initial Digitization

Initially, the development platform changed from Game Maker Studio 2 (utilized on the digitization step) to a JavaScript implementation. This change was based on intended features and scalability. The version created during the digitization step served as a benchmark for the mechanics from Brain Company. From this point, we decided to create a new game from scratch, based on the design aspects of Brain Company. The main change is on how the objective of the game is presented to players. In Brain Company, players aimed to score higher to compete with other players and perform well.

In this new version, players take influencers' role, and their final score is based on the number of followers they can obtain. To increase their number of followers, they must share reliable news and block fake news. If they do the opposite, the number of followers will decrease.

According to results from a preliminary online survey, this design decision focuses on the sharing behavior in social media among youth in Japan. We built an online version of the game as a mock-up. We listed up 20 posts (including real and fake news) and asked respondents to make decisions on sharing (public share, limited share, and not to share) and indicate the reliability of that post.

Table 1: Results of sharing behavior.

RESULTS	Percentage (n=566)
Shared (public)	10.2
Shared (private)	10.0
Did not share	79.8

There were 566 valid responses, and the age range varies from 15 to 24 years old. The results revealed that 79.8% of respondents did not share posts (Table 1). When asked about why they shared a post, 55% declared that it was because the post content was 面白い (omoshiroi) that stands for interesting, funny, entertaining (Figure 3). Regarding criteria to evaluate the post's credibility rate, 61.48% mentioned the citation source, followed by 59.72% who mentioned the author of the post. The number of likes and shares also influences the decision (26.33% and 20.85%, respectively). Based on these results, we decided to add an incentive component to stimulate users to share more posts.

Figure 3: Reasons and motivation to share posts.

The results of this preliminary survey shaped the design refinements of this version. The following list details features added on the design of the new game, many of them aiming at engaging players by making the game more realistic or containing interactions that mimic social media usage:

- Existing news: all news shown to players are examples of real news or fake news. In Brain Company, some of the information was based on real cases, but not necessarily the same as the original source. From now, all news shown is based on real (or 'real gale's) sources;
- Statistics: players can see in real-time the answers from other players. This can influence how information is perceived based on the pressure of other players. In the discussion step, comparing players' answers and utilizing captured data to generate relevant statistics on answering patterns

and information perception can be a resource for discussion and learning;

- Specialists perspective: players can see specialists' opinions on the credibility of each of the news they blocked or shared. This can be used as a material for the discussion session in the second part of the game, showing different perspectives on how to assess information reliability;
- Algorithm-based scoring system: the scoring system for the new game is based on relevance algorithms utilized in social media services. If a specific news is shared by the overwhelming majority of players, then the quantity of followers the players can get or lose is also higher, increasing the weight of their decision. This aims to mimic how trends tend to be highlighted on content websites, with everyone talking about the same subject. Many times, when a new trend happens, many content producers / influencers also create content on the same topic, as trendy can mean increased revenue or exposure. Because of how information tends to be replicated thousands of times during trends, the impact can also be greater. After the game session, players will be able to see how many followers each player obtained.

Some of the features are still a work-in-progress in terms of implementation, but already defined as part of the new design. The changes in design presented in the next chapter aim to increase the engagement of the players and make the game more connected to real-life internet usage.

3.6 Incentive Design and User Engagement

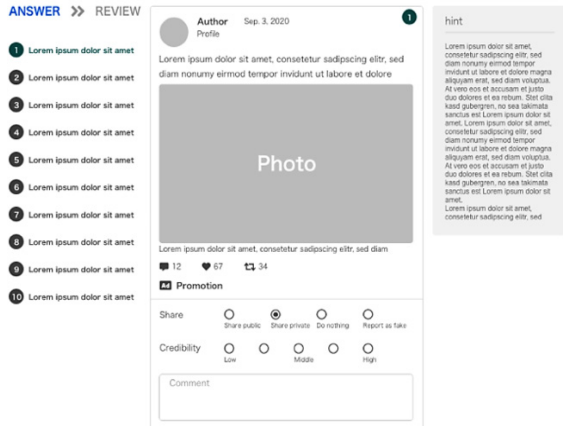

Figure 4: New game implementation and interface.

The new design aims to be more realistic and add more layers when assessing the credibility of information. To achieve a more relatable and believable setting, a new visual style was developed to mimic a social media interface. This change also relates to the change that players now play the role of an influencer with the objective of having more followers. The following picture (Figure 4) is an example of the new user interface added to the game.

The setting of being an influencer in online media is chosen to create a more relatable setting for players. Students participating in the game sessions during the media literacy course are university freshmen and, in general, close to the reality of social media usage. Being an influencer also means that they would be held more accountable towards what they share on social media.

In this phase of the design, the tool introduces components that will help understand social media sharing behavior. The first one allows players to define the range (public or private) when sharing a post. The decisions taken at this point will impact the number of followers they will get or lose. The algorithm used for the following count (Table 2) allows those who share posts with no fake information, will get more followers. On the other hand, if they share fake information, they lose followers.

Table 2: Algorithm for followers count.

SHARING	Not Fake News post (x=followers)	Fake News post (x=followers)
Public	x + 3x	x – x/2
Private	x + 2x	x – x/4
No sharing	No change	No change

The second component is related to information credibility. Players can rate how credible they believe each news to be and an open space for commenting on the reasons they decide to share or block the news. This information is not meant to impact the final score of the game as much, but to generate data that can enrich the discussion session after the play sessions. From the perspective of the player, it aims to evoke further consideration before making a final decision during the game. In some cases, information cannot be defined as totally fake or true. There might be some truth in a piece of fake news, when looked at from different perspectives or different contexts. This creates a dilemma in which people can get confused when assessing information reliability. Evaluating how certain a player is in their choice of sharing or blocking a certain news can generate meaningful data that can be studied further.

The final prototype in this phase was composed of 10 posts extracted from real social media and included real news, fake news, advertising (or promotion), and opinions. Each participant starts with 100 followers. The players are encouraged not only to increase the number of followers, but also to play it as close as to an actual situation in social media in their daily lives.

4 ITERATIONS AND ANALYSIS

Two different iterations were conducted over the prototype described in 3.7 as of this paper's submission date (January 2021). The following subchapters describe both iterations and present preliminary conclusions for this phase of the research.

The first iteration was conducted in mid-November of 2020, in a hybrid lecture environment with 13 freshmen students (onsite and online). They had a brief explanation about the serious game and how it works. The gameplay was set for 30 minutes and followed by class discussion. After the end of the activity, they answered an online questionnaire about their impressions.

The questionnaire was built to understand sharing behavior in social media, the criteria they use to make their decision to share or not a post and what was their impression after using the simulator.

The results revealed that eight among 13 students mentioned the "verified account" mark was the main factor in evaluating the posts' credibility. Besides, most students (12 among 13) mentioned the account holder as the primary valuation criteria. On the other hand, students are likely to mention services and platforms and data aggregators such as Yahoo!News, LINE News, SmartNews, Twitter and YouTube when asked about the original media source.

According to the students' impressions comments, it is very likely that the activity can trigger reflection on users' online behavior and even made them change their perception towards evaluation criteria. "Until now, I used to rely on verified account marks to evaluate online information, but I felt that even a verified account could be sharing a piece of questionable information. I need to be more careful from now on," said one of the students. "This activity made me think and reflect about my criteria to evaluate information online, and it made me realize that my evaluation criteria were not clear."

A second iteration was held in late December 2020 in an online classroom setting with 23 students. The main finding came from the feedback from stakeholders. We interviewed the lecturer who conducted both iterations in his sections and with the media literacy course coordinator. The lecturer mentioned that students were engaged in the activity. Discussions started with the spontaneous comparison of the number of followers at the end of the game, indicating that the gamification component of the experience likely contribute to engage and motivation for sharing. The coordinator said there is a great potential in this serious game since the ultimate goal is not about winning or losing; there is no right or wrong. The final result reflects the real situation and may help students to understand their online behavior.

Both made suggestions of features such as the visualization of the game progress. They also emphasized that the initial briefing should not be too long or too detailed because it may influence students' mindset in a competitive direction.

5 FUTURE WORKS

The first run of the game in the actual course setting is scheduled to start in Japan's new academic year, starting in April 2021. The team will then refine its design to match the media literacy course's academic needs according to the feedback and findings from iterations.

One of the main improvements is related to the lecturer's feedback, such as an interface to share real-time progress of all students and final results and the customization of real content. These factors may define and give more flexibility to the way lecturers conduct the activity and the discussion afterward.

After the first course run, we expect to explore the data collected and feedback to make a more in-depth analysis of the first version of this serious game and evaluate the impacts of this approach in a real educational setting.

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