

Designing an Educational Game for Facilitating Development of Media and Information Literacy

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Abstract: This study describes the development and formative evaluation of a board game intended to facilitate players' development of awareness, knowledge and strategies related to media and information literacy in the post-truth era. Preliminary data were obtained from one gameplay session with nine players, and we analyzed how they understood and interacted with news issues in a simulated post-truth context. The results of qualitative analysis reveal the strengths and weaknesses of current design in terms of whether expected game experience and learning experience were achieved. The findings contribute to further revision on game design and unlock the educational potentials for adopting a game-based approach to promote media and information literacy.

Keywords: Game-based learning, media and information literacy, game development

1. Introduction

The pervasive utilization of the internet and social media has transformed online social networks into a dynamic environment. However, it also poses challenges such as the proliferation of misinformation, which refers to false or misleading information (Ecker et al., 2022). In today's increasingly complex information environment, this issue has become a global concern, signaling the arrival of the post-truth era (McIntyre, 2018). Facing the post-truth context, equipping people with the requisite media and information literacy (MIL) has become an essential issue (UNESCO, 2021). Various efforts have been devoted to enhancing people's resilient engagement in complex media environments, such as promoting fact-checking strategies (DeCillia & Clark, 2023), developing news literacy or MIL interventions (Ferrucci & Hopp, 2023), adopting inoculation-based games (Maertens et al., 2021; Roozenbeek & van der Linden, 2019), etc. However, the existing efforts in promoting MIL still face challenges. For instance, intervention projects associated with MIL education often focus on concrete abilities, such as accurately discerning fake news. However, they may fall short of keeping up with the rapid changes in the media landscape and lack interactivity.

Games can potentially make MIL learning meaningful by engaging players in a simulated media environment where they need to employ strategies to critically evaluate information (Barzilai et al., 2023). Considerable game-based approaches (e.g., Maertens et

al., 2020; Roozenbeek & van der Linden, 2019) simulated social media contexts to demonstrate the media dynamics. However, as one systematic review regarding employing games in tackling misinformation points out: Most games expose players to minimal doses of misinformation manipulation ways; within informal settings and with adult participants; and fall short of intervention time as 15 minutes on average (Kiili et al., 2024).

We aim to create the game-based learning experience which allows players to experience the complexity and dynamics of social media, especially the manipulation and dissemination of news information. Players are expected to: (1) build awareness and construct knowledge related to MIL (i.e., news popularity and credibility); (2) develop skills to interrogate news credibility. This research aims to formatively evaluate the usability of the current design and identify necessary game revisions, following two research question:

1. How do players perceive their gameplay experience in terms of its simulation of the complexity and dynamics of the real social media world?
2. Do players perceive or experience learning opportunities related to MIL development from their gameplay experience?

2. Methods

2.1 Game design

The board game, News Anchor, is designed to enable a game-based learning experience where players can experience the complexity and dynamics of social media and construct knowledge related to MIL flexibly. To realize our vision, we made some designs for this game (see Table 1). During gameplay, players are news anchors who need to select and report news to earn money and build up fame. The player who earns the most tokens (a substitute for money) will be the winner after three rounds of gameplay.

Table 1. Design Expectations and Corresponding Designs

Expectation		Game Design	Example
Experiencing the complexity and dynamics of the social media world	Multiple perspectives towards news event	Providing articles framed in diverse perspectives towards the same event.	News event: a girl was harassed by a boy whose father is a mayor. Perspectives: confrontation with privilege; sex education; parents' concerns and community efforts.
	Agenda-setting on social media	Twists of events; secret tasks for some players to guide other players' opinion.	In the harassment event, some players are government officials who need to protect the government's fame by distracting public attention from negative direction.
	The importance of being first due to limited	Players need to compete for limited news resources. Players who lose the	—

	media resources	ownership need to pay for copyrights.	
Developing awareness and knowledge related to MIL	Awareness and knowledge about news popularity	Players need to assess news' potential regarding popularity. Popular news brings tokens.	For the harassment event, players will see three news articles with different positions. They need to select one based on perceptions of potential popularity.
	Awareness and knowledge about news credibility	News headlines are provided before releasing full content. A mismatch may exist between headlines and content; each news has some flaws which players are expected to critically analyze them.	"Some people even revealed that the mobile app developed by Professor W's team has a vulnerability to eavesdrop on personal information. When an app user is talking about "research funding", the user's phone will record and upload conversations to a central server." This accusation against the professor should be false as it is technologically impossible.
	Knowledge about the interrelationship between popularity and credibility	Both popularity and credibility contribute to the final token. The final token = publicity * credibility (of the reported news).	Sometimes the most credible news may be most popular, but it is not always true. It depends on players' choices.
Developing strategies to evaluate news	Strategies to interrogate news credibility	Players can attack dubious parts of others' news. Reasonable attacks impair the news' credibility by 10%.	–
	Strategies to manipulate news popularity	Players can "sell" news articles to others to increase news popularity.	When the news owner "sells" news articles to other anchors, they can manipulate the importance and significance of reporting it.

2.2 Data collection and analysis

After researchers' iterative design process, a prototype of game design was produced. A testing session was held to evaluate the design with actual players and to identify further revisions. Two aspects of gameplay were evaluated to assess the usability of the game: players' experience of simulated characteristics of the real social media world and their development of awareness, knowledge, and strategies related to MIL (i.e., news popularity and credibility). One of the researchers worked as a facilitator to facilitate the gameplay.

The testing was held at a university in Hong Kong. Nine players (seven female and two male players) joined the game. The session consisted of a 40-minute gameplay and a 40-

minute reflection. Field observation (including notetaking and videotaping) and a focus group interview were employed. Two researchers coded the transcripts of recordings and the field notes to identify indicators of (1) players' awareness of the complexity and dynamics of the social media world, (2) their development of awareness and knowledge about popularity and credibility, and (3) their development and employment of strategies to evaluate news.

3. Preliminary results

Overall, players noticed and experienced some simulated characteristics of social media. They demonstrated the development of awareness, knowledge, and strategies related to both news popularity and credibility. Indicators of evidence to answer the two research questions will be described in the following subsections.

3.1 RQ1: *Players' experience of simulation*

Among the three characteristics of social media – diverse perspectives towards news events, establishment of social media agenda-setting, and the importance of being first – simulated in the game, players touched the multiple perspectives and positions behind news (the first characteristics). For instance, when one of the players, Ann, raised questions of "why the first two news are similar, but the third news focuses on another topic" in the first round of gameplay, other players began to think about the interconnection among the news. With some prompting from the facilitator, other players then realized that the three news articles adopted different positions over the same event. This reflection forms a vivid experience that media positions can lead to different reports and consecutive interpretations.

However, participants did not fully understand the other two characteristics during the gameplay – the establishment of social media agenda-setting and the importance of being first. Secret tasks were designed to make players experience the agenda-setting mechanism, but players did not finish them. A possible reason is that secret tasks were not prominent enough and players did not notice them, or players noticed them but did not understand them, as some participants mentioned the game rules were complicated. This may lead to cognitive overload and players can feel confused. Similarly, players did not exhibit strong motivation to buy news as quickly as possible, probably because the design for buying news is complicated and they did not perceive the importance of being first. Therefore, further design needs to simplify the buying and selling rules to avoid players' confusion.

3.2 RQ 2: *Players' game-based learning experience*

3.2.1 *Popularity*

During the gameplay, players demonstrated a good understanding of news popularity, but employed few strategies to make their news popular. For instance, players initially thought they had to pick the piece of news with the highest credibility to win the game. However, when players attacked the credibility of one piece of news, one player proposed that dubious points

led to heated debates, which may also increase the news' popularity. This is a typical example of how players construct their own knowledge and understanding of a concept (news popularity in this case) through game-based learning experience. This game design successfully allows room and opportunities for players to construct their knowledge related to MIL by encouraging discussion and reflection during the gameplay, which is recognized by McTigue and Uppstad (2019) as a good practice of facilitating game-based learning.

3.2.2 Credibility

Players' passion and enjoyment reached a heated pitch during the credibility questioning phase, in which they can critically judge what they bought. Four questions regarding credibility were raised in the first round of gameplay. Three of them addressed illogical issue or incoherence, while another questioned argument addressed a comparatively implicit problem. All the questions were proposed to attack one news while the other two pieces of news were almost neglected. It resembles the "spiral of silence" phenomenon, which describes that an individual's perception of the flow of public opinion can influence that individual's willingness to express personal opinions (Taylor, 1982). It can also be due to the limited time, as one player, Daisy, realized this imbalance and said "I thought it was (unclear) emphasize on news number one. And then we didn't have much chance to talk about use two and three. So I thought it (credibility attack) is not over yet".

Beyond attacking credibility, players also considered approaches to increase news credibility. Eva mentioned that "I think if we provide some supportive evidence, could we increase the credibility?". Weston suggested that "maybe we can do a poll after we defend and do the. If half of people agree then just deduct." Both imply that players constructed their knowledge about what constitute news credibility and how to judge credibility.

At the same time, players began to consciously think about news credibility after the gameplay. In the focus group interview, Gree shared her increasing awareness of credibility after the gameplay and said, "the debate is the way to practice our critical thinking, because sometimes we just read the news, but we did not think if everything in the fact".

4. Discussion and conclusion

The study attempted to test the usability of the board game in simulating complexity and dynamics of the real social media environment and in facilitating development of awareness, knowledge and strategies related to MIL. The game design successfully deals with the problem of oversimplified simulation of media environment (e.g., categorization of news into "truth" and "fake news"), which, as mentioned, were prevalent in other games (e.g., Barzilai et al., 2023). The authentic simulation enables players to address real-life social media issues outside of the game. Instead of passive learning in a context where limited misinformation manipulation ways were provided (Kiili et al., 2024), this game fosters an open environment, empowering players with greater autonomy to navigate the media environment and to manipulate news as much as possible. It also encourages players' interactive and constructive engagement in evaluating news as they developed flexible strategies to promote news

popularity, attack and defend news credibility. Nevertheless, simpler game mechanism may allow players to fully experience the designed characteristics of social media environment and reflect on their gameplay and learning experience.

This study confirms the potentials of employing a game-based approach to engage players in developing MIL, which is an increasingly important aspect in today's post-truth era. It offers insights into how individuals interact, evaluate, and interpret intricate news issues in a simulated game context. Further research can adopt other methods to improve the effectiveness and to understand players' knowledge construction process during gameplay.

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