

Gamification of Information Literacy Learning Scenarios



**Intercultural Perspectives on Information Literacy and Metaliteracy:
A transnational online course in winter term 2022/2023**

Group 3 (Karen Malin Krüger, Olivia Clarissa Kaiser, Devanshi Arora)

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1. Definition

“Gamification refers to the use of design elements characteristic for games in non-game contexts.”

- Deterding et al. (2011, 13)



2. Introduction and Research Aim

- gamification aims to increase the learner's engagement and motivation in learning contexts
- as gamification exists in a wide range of educational contexts, it is also used to improve information literacy and metaliteracy abilities within information literacy and metaliteracy learning scenarios
- **our aim is to find out how gamification can be applied and implemented systematically when developing new information literacy learning scenarios**
 - identifying game-design elements that are useful within information literacy learning contexts
 - finding evidences of the effectiveness of gamification usage in these contexts

3. Research Overview



Majuri et al. (2018) analyzed how gamification has been implemented in empirical research papers in the field of education and learning by conducting a literature review with a focus on the following aspects:

- **What types of motivational affordances have been implemented?**
 - the most commonly utilized ones signal progression or achievement (e.g. experience points, badges, and leaderboards), whereas immersion-oriented (e.g. avatars and virtual worlds) and social affordances (e.g. teams, social networking features and peer-rating) are less common
- **What kind of psychological and behavioral outcomes of gamification have been studied?**
 - the psychological outcomes studied most often are user experience and perception of the system and its features
 - the behavioral outcomes investigated are primarily focused on quantifiable performance metrics (e.g. course grade, speed and gained score)
- **What kind of results have been reported in the studies regarding the usage of gamification?**
 - the results noted exhibit a strong positive orientation



4. Methodology for Practical Insights

- search for case studies using Google Scholar and academic research databases, such as ACM Digital Library → selection of five studies
- **selection criteria:**
 - publication in conference proceedings, scholarly journal or academic anthology to ensure sufficient scientific background
 - publication within the past ten years, hence not older than 2013, to ensure relevance
 - thematic focus on introducing or improving information literacy or metaliteracy while applying gamification
- categorization of game-design elements into achievement/ progression, social aspects and immersion following Majuri et al. (2018, 14)

5. Presentation of Case Studies

Bad News (Roozenbeek & van der Linden, 2019)

Description and goal of the project:

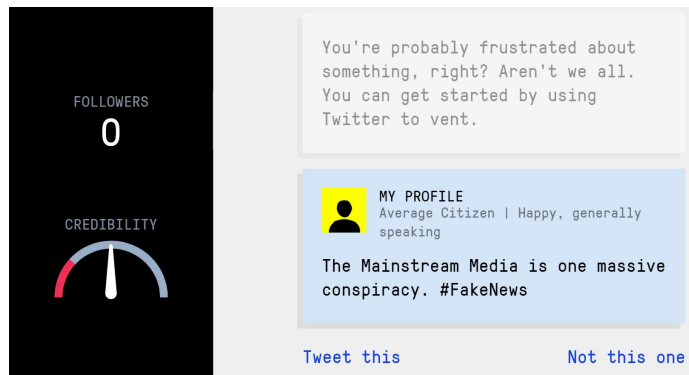
- web-based social impact game in which the players take on the role of a fake news creator and learn to master six techniques often utilized in the production of misinformation in order to improve people's abilities to spot and resist misinformation

Achievement/ Progression:

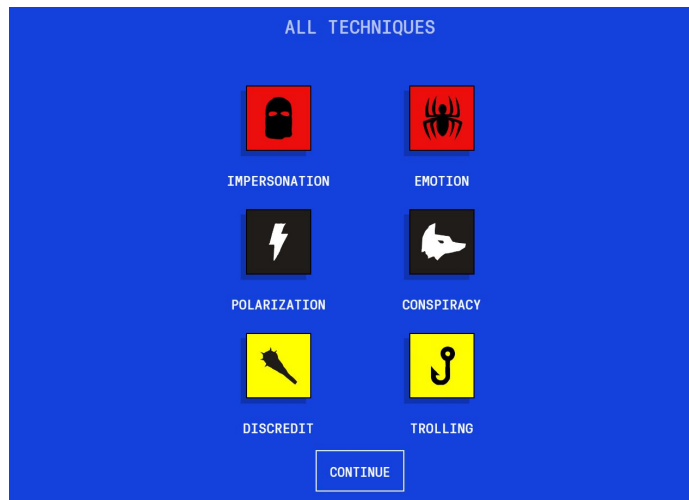
- players must attract as many followers as possible while maximizing credibility at the same time and the total number of followers at the end counts as the final score
- players can earn six badges throughout the game after successfully mastering a misinformation technique

Immersion:

- role play, storytelling and dialog-like decision making
- players are rewarded for using the strategies they learn in the game, and are penalized for choosing options that are in accordance with ethical journalistic conduct by either gaining or losing credibility or followers



Follower and credibility meters (on the left) and example tweet (on the right)
(Tilt & Cambridge Social Decision-Making Lab, n.d.)

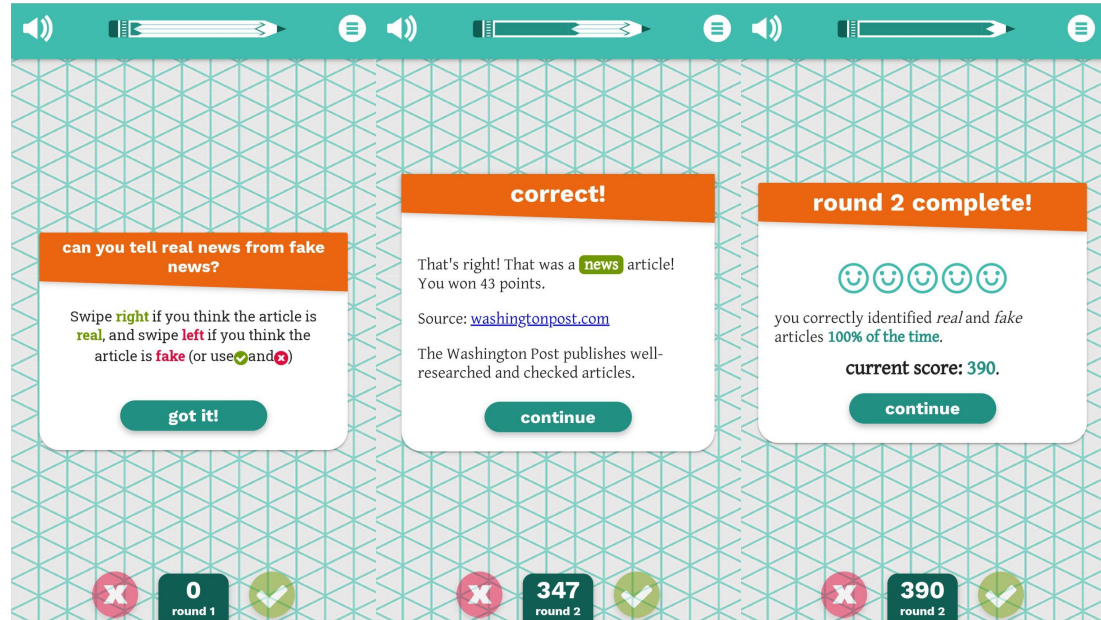


The six badges that players can earn throughout the game
(Tilt & Cambridge Social Decision-Making Lab, n.d.)

Factitious (Grace & Hone, 2019)

Description and goal of the project:

- browser-based social impact game in which users are given news articles and they have to judge whether it is fake news or not in order to educate users on thinking critically and thus improve their news literacy



Initiation instructions (on the left), feedback (in the middle) and completed round (on the right)
(Farley & Hone, n.d.)

Achievement/ Progression:

- three rounds and around five article reviews per round
- progress bar in form of a pen that is continuously filled with color per round
- certain number of points for every correct judgement, which are collected to a final score
- multiple levels: easy (for middle schoolers), medium (for high schoolers), and hard (for college students)

InfoSkills2Go (Laubersheimer et al., 2016)



Description and goal of the project:

- website filled with a series of tutorials, games and assessments for college-bound high school students to learn about and practice information literacy skills and concepts

Achievement/ Progression:

- students can earn badges in four different categories: Academic Integrity, Information Seeking, Information Organization and Evaluation
- each of the badges consists of three to six tasks, such as a tutorial, a video, a game or a short reading assignment on a given topic
- for each task an assessment is given, which are mostly automated by using auto-graded, multiple-choice quizzes
- a leaderboard to track the process of students is implemented

Social aspects:

- competition between the students in terms of ranking on leaderboard

SEEK! (Walsh, 2014)



Description and goal of the project:

- card game which aims to improve the construction of search strategy abilities as a key information literacy skill in higher education contexts → used within learning sessions taught by librarians

Achievement/ Progression:

- reward system consisting of points to raise motivation → the students take turns asking each other questions from a deck of cards to earn points for either the questioner or the person who answers

Social aspects:

- cooperation in groups of three to eight players

Immersion:

- in-game rewards and penalties: wildcards (special event cards), bringing some kind of gambling or element of chance to the game and promoting discussion between the players
- it is also possible to reward or penalize the players for activities, such as missing out a learning session

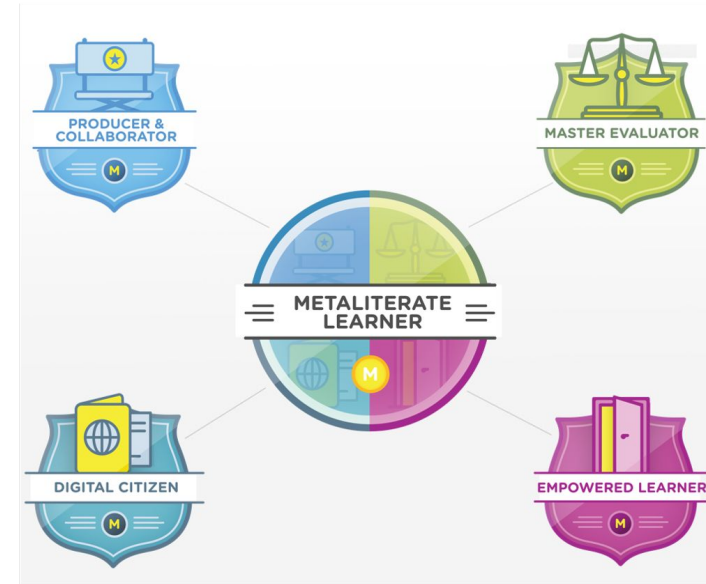
Metaliteracy Badging System (O'Brien, 2018)

Description and goal of the project:

- project of the Metaliteracy Learning Collaborative at the State University of New York, based on the metaliteracy goals and learning objectives which encompass the four metaliteracy learning domains affective, behavioral, cognitive, and metacognitive

Achievement/ Progression:

- learners can earn four main badges by completing challenges or quests in several distinct areas for each badge:
 1. Master Evaluator (Content Analysis and Perspectives & Responses)
 2. Producer & Collaborator (Global Contributor and Creator)
 3. Digital Citizen (Information Ethics and Social Identity)
 4. Empowered Learner (Metacognitive Reflection, Critical Thinking and Learner as Teacher)



The four metaliteracy badges that learners can earn
(Metaliteracy Learning Collaborative, n.d.)

6. Overview of Game-Design Elements in Information Literacy and Metaliteracy Learning Scenarios (N=5)

Achievement/ Progression		
Points, score	4	Grace & Hone (2019), Laubersheimer et al. (2016), Roozenbeek & van der Linden (2019), Walsh (2014)
Challenges, quests, tasks, clear goals	4	Grace & Hone (2019), Laubersheimer et al. (2016), O'Brien (2018), Roozenbeek & van der Linden (2019)
Badges	3	Laubersheimer et al. (2016), O'Brien (2018), Roozenbeek & van der Linden (2019)
Quizzes, questions	3	Laubersheimer et al. (2016), Roozenbeek & van der Linden (2019), Walsh (2014)
Leaderboards, ranking	1	Laubersheimer et al. (2016)
Levels, rounds	1	Grace & Hone (2019)
Progress bars	1	Grace & Hone (2019)
Social Aspects		
Competition	2	Laubersheimer et al. (2016), Walsh (2014)
Cooperation, teams	1	Walsh (2014)
Immersion		
In-game rewards and penalties	2	Roozenbeek & van der Linden (2019), Walsh (2014)
Narrative, storytelling, dialogues	1	Roozenbeek & van der Linden (2019)
Role play	1	Roozenbeek & van der Linden (2019)

7. Effectiveness of Gamification in Information Literacy Learning Contexts



- issue in gamification research on a general level → studies rarely contain a controlled experimental study design and hardly ever examine the effects of one element at a time (Dichev & Dicheva, 2017, 25-26; Majuri et al., 2018, 16)
- out of the five papers selected, only two investigate whether their project has the intended outcome overall using a pretest-posttest design, but none measure the effectiveness of each utilized game-design element separately
- “InfoSkills2Go” by Laubersheimer et al. (2016) and “Bad News” by Roozenbeek and van der Linden (2019), whose pre- and post-test comparisons showed their projects to have the desired outcome, have a badging system as a core game-design element in common

8. Possible Negative Effects of Gamification



Toda et al. (2018) investigated what negative effects can occur when gamification is applied to educational contexts by conducting a systematic mapping study and identified four main ones that were often associated with the PBL (Point-Badge-Leaderboard) approach:

1. **loss of performance**, when situations arise in which the gamification approach harms or hinders the learning process for various reasons
2. **undesired behavior**, mainly demotivation and anxiety due to excessive competition as a consequence of the chosen gamification approach
3. **indifference**, meaning the gamification approach does not exert any impact on cognition and performance and thus does not improve the learner's knowledge gain compared to traditional learning methods
4. **declining effects** related to the gradual loss of motivation and engagement due to the deployed gamification approach → the intrinsic motivation to learn is undermined with a constant need for extrinsic motivation



9. Success Factors of Gamification

- remember that not every gamification approach is suitable in every learning context (Dichev & Dicheva, 2017, 25-26; Majuri et al., 2018, 17-18; Toda et al., 2018, 152-153)
- avoid “pointsification”, which means to solely add a scoring system to an activity, because the learner might not connect the rewards to the relevant learning which they are actually meant to encourage because the learner is only focused on the rewards themselves (Nicholson, 2012, 223)
- consider instructional and motivational design theories when trying to increase the learner’s motivation and engagement (Toda et al., 2018, 10-11)
- take the learner’s characteristics, such as their personality, age, cultural background and educational needs, into account (Majuri et al., 2018, 17-18; Toda et al., 2018, 152-153)



10. Summary and Conclusion

- despite the potential advantages, the relatively new research field of gamification still needs to be further investigated systematically
- common game-design elements in information literacy and metaliteracy learning scenarios are points, challenges, badges and quizzes
- the existing evidence in research to support the long-term benefits of gamification in educational contexts, including information literacy learning scenarios, is still insufficient
- contextual factors such as culture and personality are a potential source of varying results and should therefore be paid more attention to in future research

11. Recommendations for further reading (case studies)



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Thank you for listening!