




# Media Literacy Training Against Fake News in Online Media

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**Abstract.** Fake news undermine democratic processes by misinforming citizens and discrediting official institutions as well as established media platforms. While many theories and approaches to combat fake news have been proposed within the last couple of years, there has been a lack of implementation and evaluation of media literacy trainings to oppose widespread online misinformation. To fill the void, this research combines digital game-based learning and classic theories of competency acquisition in order to provide an evaluation method for future media literacy trainings. To achieve this, the web based digital game “Bad News” has been evaluated in comparison to a classic text-based form of information transfer. While there have been no significant results supporting a higher efficiency of the digital game-based approach, positive effects on subjective learning success and motivation could be shown. This piece of research can act as a stepping stone for further research as well as grant first insights into the effectiveness of interactive digital game-based learning on the perception of fake news in online media.

**Keywords:** Fake news · Media literacy · Digital game-based learning

## 1 Introduction

With the amount of attention fake news have been getting since the 2016 US presidential election, the subject matter has only grown over the last few years. Fake News impact not only politics, but also journalism [1] by misinforming citizens and lowering the trust in established media organizations and news in general [2]. This paper combines approaches from media and communication science, psychology and educational science to propose one way of dealing with this issue: digital game-based learning as a means of inoculating the public against fake news in online media. Said approach has been evaluated in form of an online media literacy training and provides insights into the effectiveness of learning through digital games when dealing with fake news.

## 2 Theoretical Background

**Fake News** have been defined and classified in various ways over the last few years depending on their form or function. They can be defined as news articles which are intentionally and verifiably false and aim to mislead media recipients [1]. Fake News can be characterised by an assortment of commonly used strategies to appeal to recipients in order to spread them as efficiently as possible. A report issued by NATO StratCOM [3] described some of those tactics: Polarising language which follows the goal of splitting societal groups, like the political left and right. Language that appeals to recipients' emotions in order to get media users to share content more quickly and efficiently. Spreading of conspiracy theories and discrediting established institutions to undermine governments and mainstream media systems. Impersonation of public figures through fake profiles on social media to harm the reputation of said figures or use their wide range of followers to spread a message.

Users' **media literacy** can offer one way of dealing with the rising problem of fake news. Media literacy can be defined as a "set of perspectives that we actively use to expose ourselves to the mass media to interpret the meaning of the messages we encounter" [4, p. 19]. By properly analysing and evaluating these perspectives deception within media messages can be detected and therefore avoided. Some ways of doing this include checking the sources of news articles, looking for missing pieces of information or analysing the tone of an article.

**Digital Game-Based Learning (DGBL)**. One way of furthering media literacy can be DGBL. Digital learning games can be described as entertainment media aiming at cognitive changes within the player [5]. One goal of this study was evaluating the efficacy of DGBL in the context of fake news detection.

## 3 Methodology

**Setting.** The "Bad News" game, developed by the Netherlands based group DROG, (aboutbadnews.com), aims at showing players the strategies used by fake news creators. Players take on the role of a professional fake news monger themselves and are tasked with creating a growingly successful fake news website. They are guided throughout the game by an unnamed moderator who provides them with choices for further action, e.g. posting certain headlines. Fictional tweets provide the players with feedback on their actions.

The "Bad News" game evaluation comprises the following main hypothesis:

H1: The digital game "Bad News" improves the detection of fake news headlines more than an informational text with similar contents.

**Research Design.** In order to test this hypothesis, a pre-post design with an experimental and a control group was chosen. The experimental group was trained using "Bad News", while the control group learned the same from a text. Both participant groups were given the same performance test before and after learning inputs.

**Participants.** A total of  $N = 71$  German and Swiss adults participated in the study. The average age was 29 years ( $SD = 10, 16$ ) with a range of 17 to 59 years. Of this sample, 60% were female. Descriptive statistics showed that the degree of education was very homogenous with 45% of participants' having completed a bachelor or master program and 42% having achieved a higher education entrance qualification. From the participant group,  $n_1 = 38$  learned with the game, and  $n_2 = 33$  with the text. The participants were randomly assigned to the two groups, between which no significant differences in terms of demographic data could be found.

**Measures.** To measure the ability of detecting fake news in online media a performance test with a seven-point Likert scale was created ad hoc. Participants were asked to estimate the credibility of 14 news headlines – seven of which were actual fake news. To ensure pre-existing knowledge was taken into account, each headline had the possibility to be labelled as previously known which would disqualify it for further measurements.

In addition, the participants were also asked to rate how far the credibility was impacted by the factors defined in the StratCOM [3] report.

The measure of the ability to detect fake news was calculated as the difference between participants' estimates and an expert solution. The smaller the difference between solutions, the better the result hinting at a higher media literacy. Participants' knowledge gain was calculated as the difference post- minus pre-treatment performance scores. A positive value indicated learning success in detecting deception.

In addition to the performance test, the effects of the fake news game were assessed by self-report. Participants could state whether they thought they had learned something throughout the study in general or more specifically about the different strategies used by fake news creators. The self-report learning effect scale proved reliable with Cronbach's alpha .97.

**Data Collection Procedure.** The experiment was conducted online, running for three weeks. Invitations were advertised within several student groups as well as through word of mouth and sent to 120 interested parties by email. At the end of the experiment, the data were downloaded from the online questionnaire platform and processed using IBM SPSS Statistics version 24.

## 4 Findings

Examining H1 by the performance test, the knowledge gain of the experimental group was slightly lower than the knowledge gain of the control group, but the difference was not significant ( $M (Treatment) = -0.36, SE = 0.65$  vs.  $M (Control) = -0.23, SE = 0.66, t(69) = -0.83, p = 0.58$ ). Within the different dimensions portraying the used tactics and strategies (usage of polarizing or emotional language etc.) to spread fake news, no significant differences between the groups could be found either.

The subjective learning success resulted in members of the treatment group estimating their knowledge gain as higher than their counterparts with the information text ( $M (Treatment) = 4.84, SE = 1.44$  vs.  $M (Control) = 4.09, SE = 1.65; t(69) = 2.05, p = 0.12$ ).

## 5 Discussion

In terms of objectively measured knowledge gain, our participants' performance was roughly similar while learning with the digital game and using the text. However the differences between participants' and experts' solutions in the pretest were within 1.5 points. This means, the sample as a whole was rather proficient at accurately detecting fake news headlines. The fact that the game did not improve knowledge gain significantly may be attributed to participants becoming more wary of fake news after learning more about them and hence seeing even real news more cautiously. This can support claims by Barthel et al. [2] that fake news spike confusion within society. As an alternative interpretation, the cognitive changes may have occurred in participants' news reception skills, which may require consolidation before the news can be mentally processed with similar self-confidence and speed as before.

Although the game did not improve participants' knowledge gain more than the comparable informational text, the subjectively perceived learning effect was greater for the treatment group. A perceived positive learning outcome can increase participants' self-efficacy perceptions which can furthermore improve motivation for additional learning activities [6].

## 6 Conclusion

The study provides a bridge between several research fields to offer a way of tackling the rising issue of fake news in modern society. With children and young adults spending a significant amount of their free time playing video-games [7] educators can use this interest in the medium to implement media literacy trainings as a way of providing knowledge and maybe even more so motivation for further learning activities.

## References

1. Allcott, H., Gentzkow, M.: Social media and fake news in the 2016 election. *J. Econ. Persp.* **31**(2), 211–236 (2017)
2. Barthel, B.Y.M., Mitchell, A., Holcomb, J.: Many Americans believe fake news is sowing confusion. Pew Research Center, pp. 1–15 (2016)
3. NATO StratCOM Website: Digital Hydra: Security Implications of False Information. <https://www.stratcomcoe.org/digital-hydra-security-implications-false-information-online>. Accessed 18 Jan 2019
4. Potter, W.J.: *Introduction to Media Literacy*. SAGE, Thousand Oaks (2016)
5. Erhel, S., Jamet, E.: Digital game-based learning: impact of instructions and feedback on motivation and learning effectiveness. *Comput. Educ.* **67**, 156–167 (2013)
6. Shen, D., Cho, M.H., Tsai, C.L., Marra, R.: Unpacking online learning experiences: online learning self-efficacy and learning satisfaction. *Internet High. Educ.* **19**, 10–17 (2013)
7. Papastergiou, M.: Digital game-based learning in high school computer science education: impact on educational effectiveness and student motivation. *Comput. Educ.* **52**(1), 1–12 (2009)