Project Report: Does Gamified Critical Thinking Training Increase the Ability of College Students to Identify Fake Political News Articles on Facebook?

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Political online media in the United States is a subject of major scrutiny among information consumers. Though the sharing of online content has streamlined efforts for political campaigns and public opinion, online content also creates room for bad actors to spread harmful information. The term “fake news” entered the spotlight during the 2016 presidential election, and has since been a major interference in the public’s trust of mainstream political media (Alcott & Gentzkow, 2017). As fake news can impact affairs around the globe on both a macro and micro level, it is important for individuals to have a higher level of discernment in regards to curated media on social platforms in order to minimize time spent engaging and potentially perpetuating misleading information. Understanding the importance of individuals in combating fake news, research is being conducted on endowing the skills that can provide the best mindset in navigating the ever-evolving digital space. Critical thinking is the culmination of skills that are considered a disciplined methodology of evaluation for improved decision-making, meant for imparting skills in disseminating content. Studies have proposed critical thinking guidelines and resources to curb people’s susceptibility to fake news (Lutzke et al., 2019), but they do not engage with seeing how much their participants have internalized the provided skills. The prompts these studies provide to participants are also similar to the generalized approach social media platforms are taking in providing their user base, utilizing headers and text with advisory warnings against potentially misleading news media (Kruijt et al., 2022). While this approach has shown progress, the lackluster nature of the text may not be the best approach as they do not encourage the reader to further digest the meaning beyond advisory statements. Our study aims to incorporate gamification into the use of critical thinking guidelines as a means of offering incentives in honing discernment against fake news. Facebook is utilized as our target platform, as it is reported that 25.4% are young adults 18-27 years of age (Jha, Sanjeev, and Chen Ye., 2023), a typical age bracket of college students. While this is a narrow margin of students who are undergoing education, over 70% of Facebook's remaining users are above this age and can be seen as typical peers in these online social circles. Studies have proven that younger social media users are often subject to a two-step flow of information where their peers unknowingly share misleading political news with them (Mahmood, Waqas, et al., 2023). This study seeks to validate the efficacy of game-based learning’s ability to teach critical thinking skills over text-based prompts to college students who engage in Facebook content from their peers.

Our hypotheses:

H0: Game-based critical thinking training does not increase the ability of college students to identify fake news articles on Facebook.
HA: Game-based critical thinking training increases the ability of college students to identify fake news articles on Facebook.

Survey Design/Methodology

Our independent variable is the type of critical thinking training (gamified or non-gamified) and our dependent variable is the correct identification of fake news. The implementation of our

independent variable came in the form of two interventions: gamified critical thinking training and non-gamified critical thinking training. Our sample size was small, at n=10 to ensure monitoring of participants and sufficient engagement with the surveyor. The experiment was conducted in three parts: a pre-experiment survey where each participant self-assessed their ability to detect fake news. The six pre-experiment survey questions included both frequency and quality Likert scales for topics like their ability to spot fake news, how often they share news links, how often they follow news links sent to them, and the importance of critical thinking training in public schools.

Survey Questions:

1. Do you use Facebook?
    a. Yes
    b. No

2. On a scale of 1 to 5, how would you describe your ability to spot political "fake news" online?

1 (Very Bad)	2 (Bad)	3 (OK/Neutral)	4 (Good)	5 (Very Good)

3. How often do you find yourself sharing online political news content with friends?
    a. Never
    b. Sometimes (1-3 times a week)
    c. Often (4-6 times a week)
    d. Every day

4. How often do you find yourself following links to political news content sent to you by friends?
    a. Never
    b. Sometimes (1-3 times a week)
    c. Often (4-6 times a week)
    d. Every day

5. What is a characteristic you think is important to pay attention to when you read a political news article?
    a. Publisher/news outlet
    b. Ideology
    c. Factual accuracy
    d. Relevancy
    e. Tone
    f. Other (please specify): _____

6. Rank your agreement with the following statement: **comprehensive critical thinking training should be incorporated into core curriculum at public schools.**

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Demographic information (optional):

7. Which best describes your current status at The University of Texas at Dallas?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Graduate Student

8. Which category best describes how you identify?
    a. White or Caucasian
    b. Middle Eastern or North African
    c. Black or African American
    d. Hispanic, Latino, or Spanish Origin
    e. American Indian/Native American or Alaska Native
    f. Asian
    g. Native Hawaiian or Other Pacific Islander
    h. Other: _____
    i. Multiethnic
    j. Prefer not to say

9. How do you describe yourself?
    a. Male
    b. Female
    c. Non-binary/third gender
    d. Prefer to self-describe

Following the initial survey, we conducted the intervention portion of the experiment. The 10 participants were randomly assigned to each group and were unaware of which group they were in. Group 1 (*H0*) received non-gamified critical thinking guidelines in the form of a paper document, and Group 2 (*HA*) received gamified critical thinking training in the form of a Kahoot game. Kahoot.it is a fun, popular quiz-hosting site used by educators to assess and track student progress.

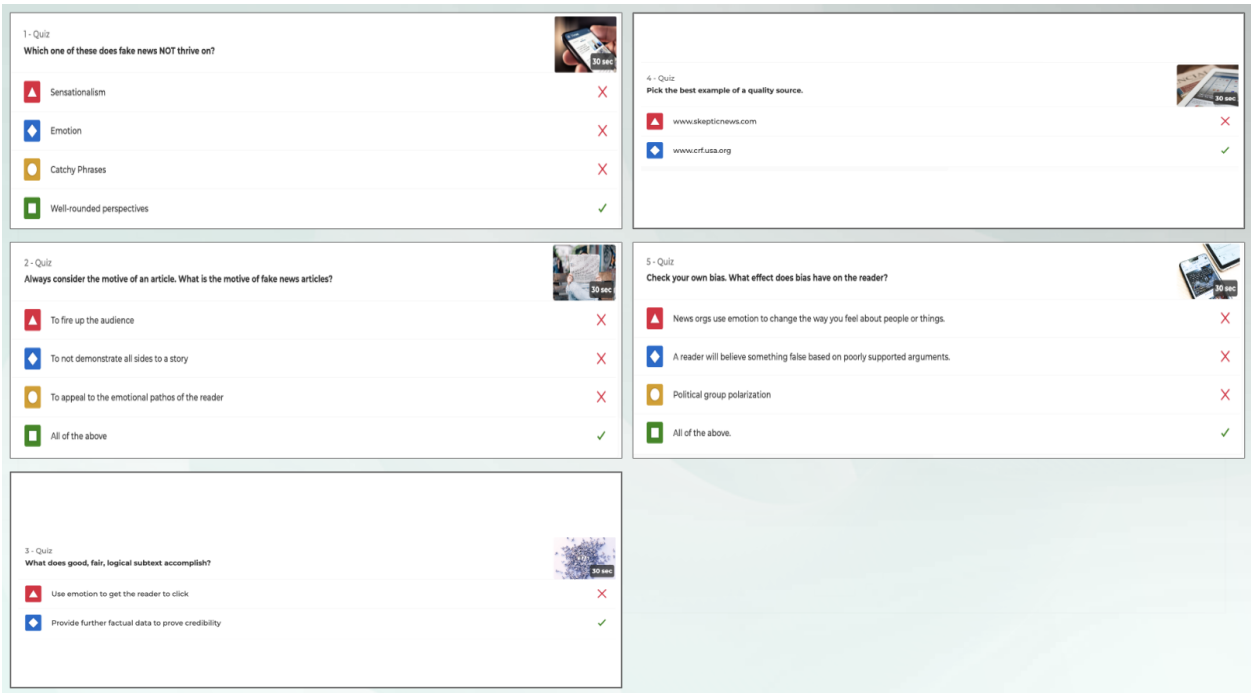
Each participant in Group 1 was given the following critical thinking guidelines in the form of a paper document. They were shown the guidelines with directions to spend 1 to 2 minutes reading them (Clever, 2020).

Group 1 Guidelines

1. Fake news thrives on sensationalism, emotions, and catchy phrases. Watch out for hateful language.
2. Always consider the motive of the article.

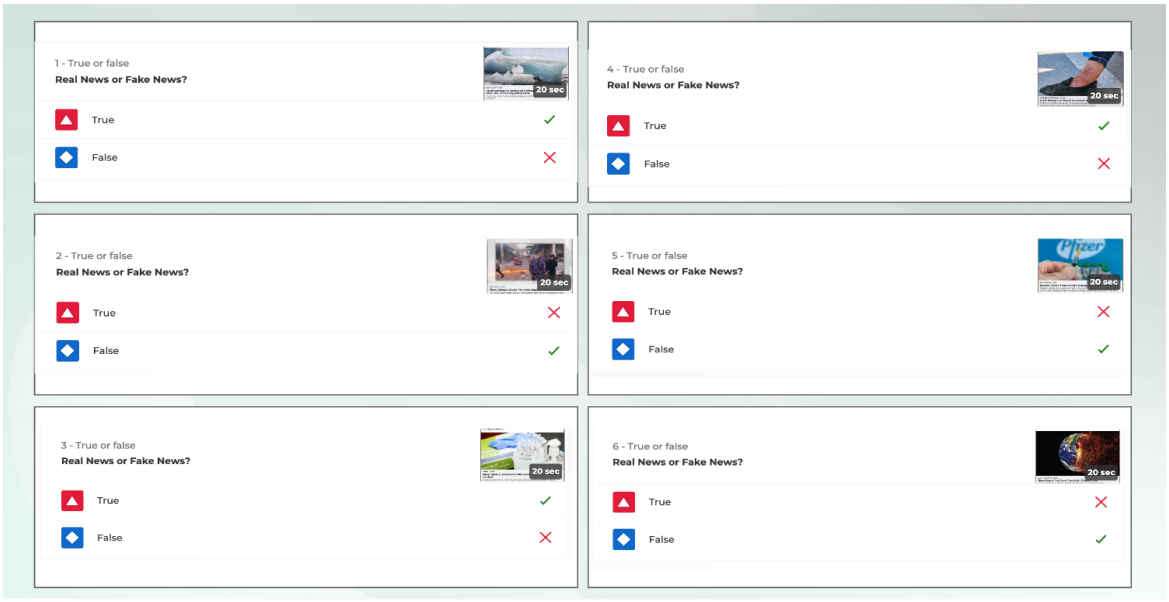
    a. Does it want to educate?
    b. Does it want to fire up the audience?
    c. Does it demonstrate all perspectives of a story?
3. Read the subtext of the article.
    a. Does it appeal to emotion to get the reader to click?
    b. Or does it aim to provide further fact-based clarity to the article?
4. Check the source.
    a. Reputable sources are often from a .org website
    b. Have you heard of this source before?
5. Check your own bias.
    a. Bias often appeals to emotion to change how readers feel about people or things.
    b. Bias can utilize poorly supported arguments to make the reader believe something false.
    c. Bias polarizes groups.

Each participant in Group 2 played a gamified version of critical thinking training on Kahoot.it. The questions were gamified versions of the regular critical thinking questions but used elements of question and answer, pick the incorrect headline, and "create your own headline."

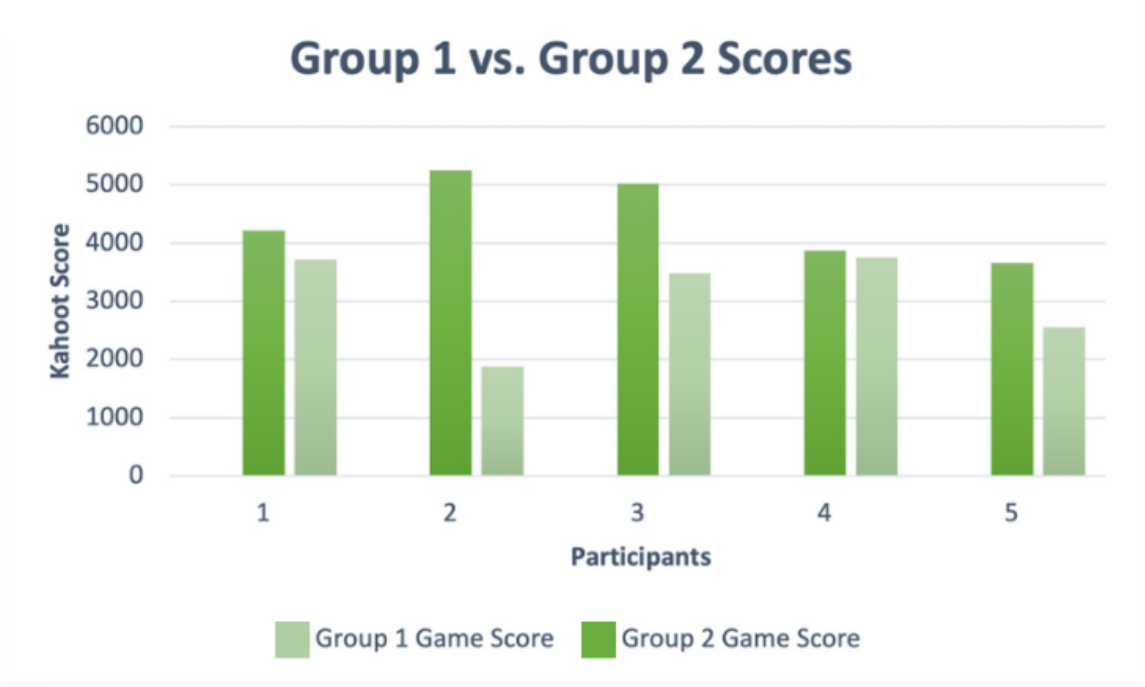


After each group reviewed their set of guidelines, both groups completed the final phase of the experiment: The Fake News Detection Test. The Fake News Detection Test was administered on Kahoot.it. Both Group 1 and Group 2 were administered the same test. They were shown 6 news article posts in the form of Facebook news posts: 3 were real from real news sources, and 3 were fake from fact-checked false news sites. Readers were asked to look at each post and determine

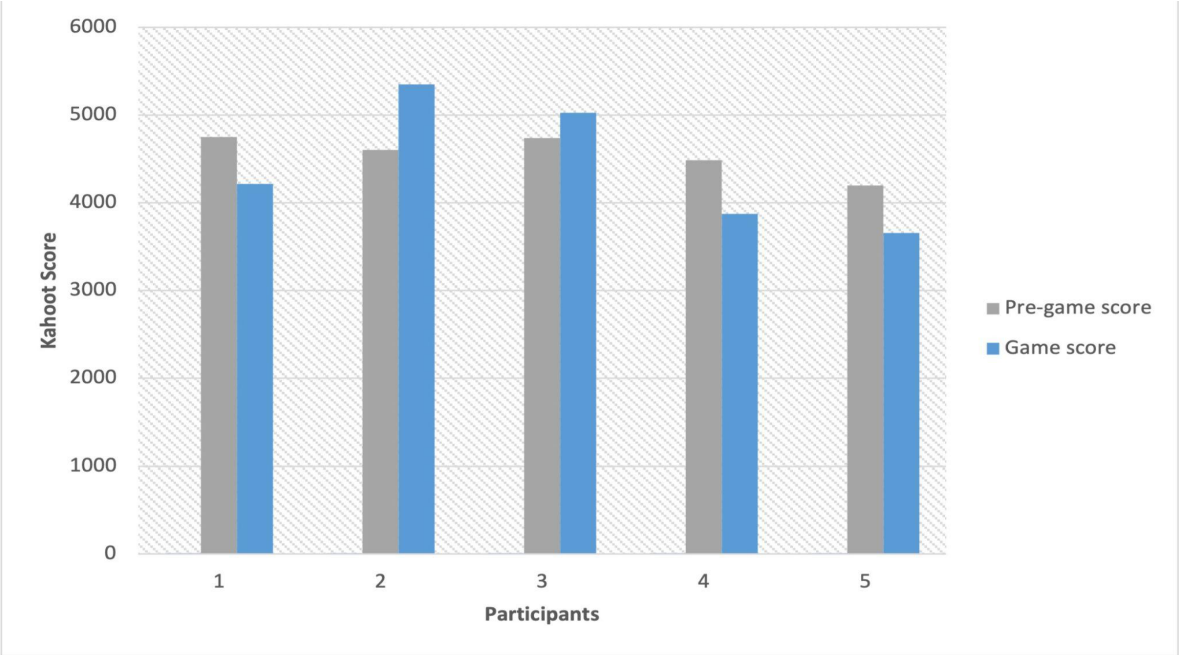
if the post was real or fake based on the headline, the subtext, and the source. They were given 20 seconds per question to make a selection. The following are the fake and real articles created for the test:



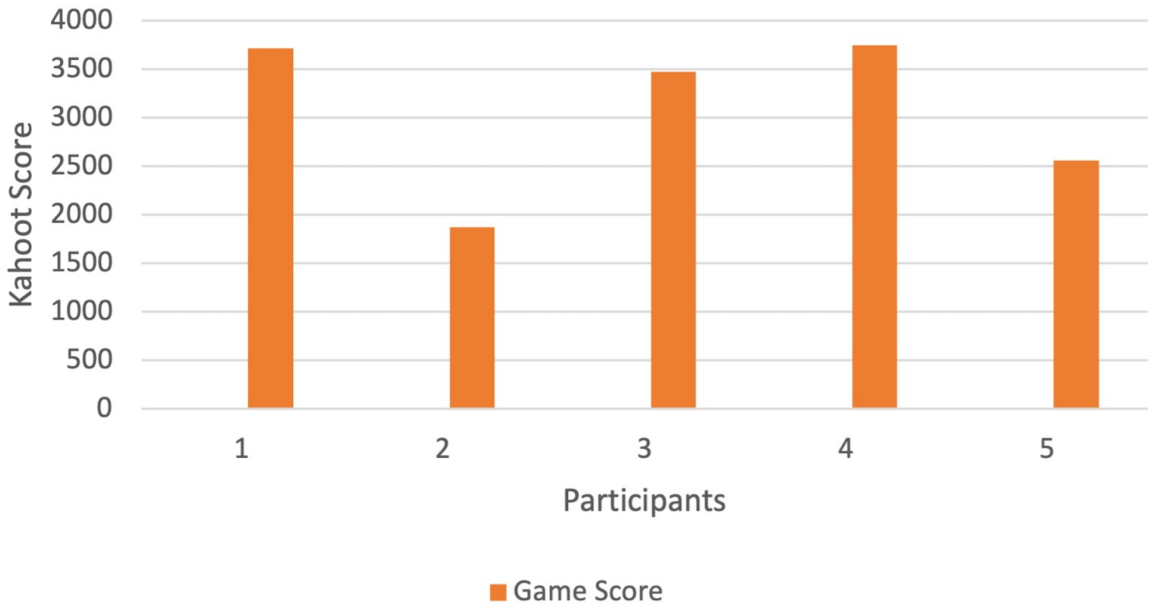
Results/Visualization:



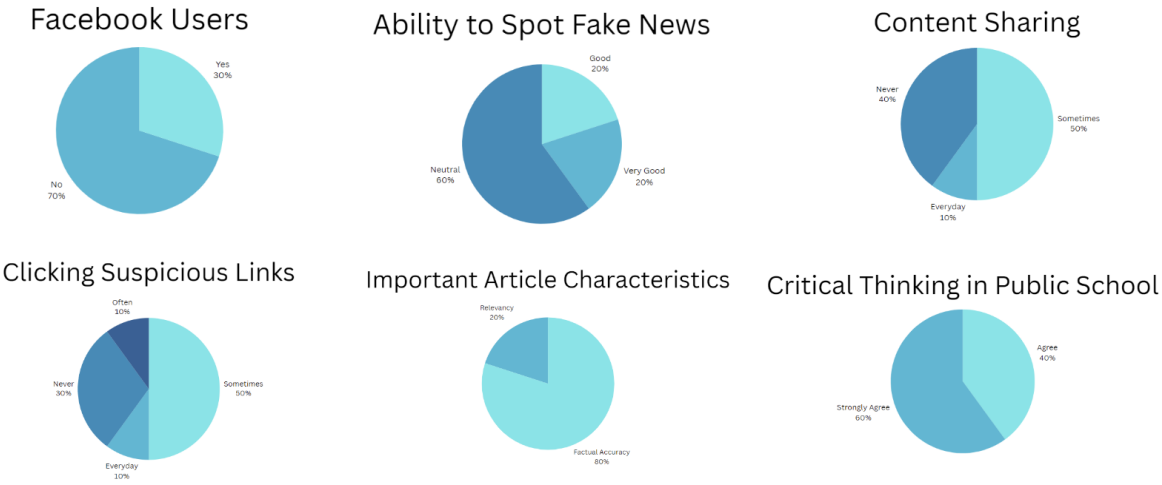
Alternate/Intervention Group (Group 2) Game Data



Null/Control Group (Group 1) Game Data



Survey Data



Participants in Group 2 did better on the “fake vs. real” test than their Group 1 counterparts. Most participants ranked their “fake news”-spotting ability at a 3 or 4, and scores reflected this. Surprisingly, most participants reported that they only share and interact with political news content only 1-3 times a week. Given the abundance of political news information on social networks like Facebook, Instagram, X, and others, it was surprising that most participants were

not active in political media sharing. Though Group 2 did better than Group 1 on the test, 3 out of 5 participants scored higher on the pre-game quiz than they did on the test. We are unsure of what could be the case for this disparity, though when comparing Group 2's test scores with their perceived ability to spot fake news, those who ranked their ability on the high end of the scale did better on the test, largely scoring in the 4,000s - 5,000s. Based on these results, we find that there is a positive relationship between our intervention and participants' abilities to spot fake news. As a result, we will reject the null hypothesis.

Discussion

The gamified critical thinking intervention appeared to have an overall positive effect on participants' abilities to differentiate fake from real news during the test. Though our sample was small, interactions with respondents showed that when engaged in a game or competition, there was more motivation, encouragement, and ambition. This trend coincides with theories relating to classical conditioning and self-determination in gamified learning -- when prompted with a reward system (points/scores), participants were much more engaged in the material and were motivated to demonstrate their abilities (Alsawaier, 2018). Participants were seemingly very self-aware when it came to their perceived ability to identify fake news. This trend has an important implication in that when it comes to dissecting news articles and keeping an open mind, people may be more willing to give their best effort in determining the reliability of the information they consume.

Our results showed a positive relationship between gamified training and the ability to spot fake news, which has multiple implications as well. Participants were instructed to rate their agreement with the following statement: **comprehensive critical thinking training should be incorporated into the core curriculum at public schools.** Participants either responded with agreement or strong agreement -- nobody held any disagreement whatsoever. When it comes to critical thinking training for students, public schools may incorporate gamified learning into the process. Games related to critical thinking and other skills could benefit students by equipping them with the skills and knowledge to determine what information is reliable. With the rise of "fake news" platforms online, as well as the development of AI that can generate fake news when prompted, these skills may be more important than ever.

Limitations

First and foremost, the scope of our research is quite narrow -- our small sample size of n=10 is not nearly large enough for a long, intensive experiment of this nature. More can be done when it comes to testing gamified learning and critical thinking training. For instance, the sample size could be much larger, perhaps with 100-200 participants. This would allow for more reliable data to be generated from surveys and tests. Additionally, though participants were motivated to earn points and perform well, participants were not *directly* competing with one another. One aspect of gamified learning studies of this nature could take advantage of is the competitive nature of participants when prompted with a game. Separate groups could take the test in one room, and when playing the game at the same time, they could see other participants' scores and find more motivation to gain an edge over their competitors.

Gamified learning in critical thinking also does not always have to be incredibly upfront -- students have the potential to garner skills when competing in games that, on the surface, appear more recreational and fun, but are designed to instill critical thinking skills. Further studies could create longer, more engaging games than just a Kahoot. Studies can even implement multiple games with different styles to gauge which style has the most positive effect on spotting fake news. There are many more directions this study and topic could go, and we are interested to see more research in the near future.

Conclusion

First, though the scope of our study was small, there are still implications regarding gamified learning and critical thinking that could be further explored in subsequent research. However, a much larger team would likely be needed for an experiment of much greater size and length. Second, we found that our experiment demonstrated an overall positive relationship between gamified critical thinking training and the ability to spot fake news, which could prompt more studies of a similar nature to replicate such findings. Large-scale studies could utilize more gaming features and even provide participants with a more intensive experience. The motivation to learn and decipher information was certainly there in this small-scale experiment and may increase when participants are put into a more competitive environment. Third, our participants seemed very self-aware when it came to their perceived ability to spot “fake news”. It would be quite interesting to see participants' attitudes in a larger sample size, and how media literacy efforts could improve consumers' confidence.

References

Allcott, & Gentzkow, M. (2017). Social Media and Fake News in the 2016 Election. The Journal of Economic Perspectives, 31(2), 211–235. https://doi.org/10.1257/jep.31.2.211

Alsawaier, R. S. (2018). The effect of gamification on motivation and engagement. The International Journal of Information and Learning Technology, 35(1), 56–79. https://doi.org/10.1108/IJILT-02-2017-0009

Clever, L. et al. (2020). FakeYou! - A Gamified Approach for Building and Evaluating Resilience Against Fake News. In: van Duijn, M., Preuss, M., Spaiser, V., Takes, F., Verberne, S.
(eds) Disinformation in Open Online Media. MISDOOM 2020. Lecture Notes in Computer
Science(), vol 12259. Springer, Cham. https://doi.org/10.1007/978-3-030-61841-4_15

Flavell, J. H. (2017, April 6). Metacognition. Learning Theories. Retrieved October 26, 2023,
from https://learning-theories.com/metacognition-flavell.html

Jha, Sanjeev, and Chen Ye. The Impact of Demographic Variables on Perception of ... - Sage Journals, journals.sagepub.com/doi/10.1177/0972150915610666. Accessed 30 Nov. 2023.

Lepper, M. R., & Malone, T. W. (1987). Intrinsic motivation and instructional effectiveness in
computer-based education. In R. E. Snow, & M. J. Farr (Eds.), Aptitude, Learning and Instruction (Vol. 3, pp. 255-285). Hillsdale, NJ: Erlbaum.

Lutzke, L., Drummond, C., Slovic, P., & Árvai, J. (2019). Priming critical thinking: Simple interventions limit the influence of fake news about climate change on Facebook. *Global environmental change*, *58*, 101964. https://www.sciencedirect.com/science/article/abs/pii/S0959378019307009?casa_token=653HLgcG94YAAAAA:89uPkBYQAnNLbcCYkhKdEzPzIE8or1x4YoDnAAHCOQPCf3P0xYowVuaSOmkDWHm4cZhRZ06DPBU

Mahmood, Waqas, et al. “Look at the Sender, Ignore the Information: Authenticity and Opinion Leaders in Spreading Fake Information to Teenagers.” View of Look at the Sender, Ignore the Information: Authenticity and Opinion Leaders in Spreading Fake Information to Teenagers, ojs.pssr.org.pk/journal/article/view/376/232. Accessed 30 Nov. 2023.

Pennycook, G., & Rand, D. G. (2021). The psychology of fake news. *Trends in Cognitive Sciences*, *25*(5), 388-402. https://doi.org/10.1016/j.tics.2021.02.007

Salovich, & Rapp, D. N. (2021). Misinformed and unaware? Metacognition and the influence of
inaccurate information. Journal of Experimental Psychology. Learning, Memory, and Cognition, 47(4), 608–624. https://doi.org/10.1037/xlm0000977

Soetekouw, L., Angelopoulos, S. Digital Resilience Through Training Protocols: Learning To Identify Fake News On Social Media. Inf Syst Front (2022). https://doi.org/10.1007/s10796-021-10240-7