Using AI-Generated Fake News to Teach Source Evaluation to Norwegian Upper Secondary School Students

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Abstract—**This study investigates how an AI-based learning platform can support upper secondary school students in distinguishing between authentic and fake news. A social media-inspired platform was developed in which students interacted with both real and AI-generated news articles within a realistic feed environment. The platform also included gamification elements designed to increase engagement and motivation. Using a Design Science Research approach, the study combined system development, classroom testing, and analysis of behavioral log data from 91 students. The results indicate that students were often able to identify manipulated content, although realistic AI-generated fake news remained challenging to detect. Students frequently relied on headlines, images, and perceived source credibility when evaluating information. The study suggests that AI-supported and gamified learning environments may strengthen source evaluation, critical thinking, and digital resilience among young users.**

Keywords-fake news; source evaluation; teaching; generative AI; upper secondary school students.

I. INTRODUCTION

The rapid digitalization of society has fundamentally transformed how information is produced, distributed, and consumed [1]. News and public information are no longer primarily accessed through traditional editorial channels such as newspapers, television, and radio. Instead, social media platforms and algorithm-driven digital feeds increasingly shape how people encounter information in their daily lives. Platforms such as TikTok, Instagram, Snapchat, Facebook, and X provide users with a continuous stream of content in which journalism, entertainment, advertising, opinion, and user-generated material are often presented side by side [2]. While this development has increased access to information and enabled broader participation in public discourse, it has also created significant challenges related to misinformation, disinformation, and source evaluation.

The spread of false or misleading information is not a new phenomenon, but the scale and speed of dissemination have changed considerably in the digital era. Social media platforms enable information to spread rapidly across large networks without traditional editorial review or fact-checking processes. Research has shown that false news often spreads faster and reaches larger audiences than information, particularly when the content is emotionally engaging, sensationalized, or controversial [3]. At the same time, modern digital platforms are designed to maximize engagement and user interaction, which may unintentionally amplify misleading or manipulative content.

Recent developments in generative artificial intelligence (AI) have further intensified these challenges. Modern language and image generation models can produce highly realistic text, images, audio, and video content that may be difficult for ordinary users to distinguish from authentic material. AI-generated misinformation can imitate the visual style, language, and structure of professional journalism, making manipulated content appear highly credible. As generative AI tools become more accessible and easier to use, producing large-scale disinformation campaigns requires significantly fewer technical skills and resources than before. This development has heightened concerns about digital trust, democratic participation, cybersecurity, and the public's ability to critically evaluate online information [4].

These challenges are particularly relevant for adolescents and young adults. According to the Norwegian Media Authority, children and young people spend a large portion of their daily lives on digital platforms, where social media functions as a major source of entertainment, communication, and news consumption [5]. Although many young users are aware that false information exists online, research indicates that they still struggle to identify misinformation in practice, especially when manipulated content appears professional, visually convincing, or emotionally engaging. Young users often encounter information in fast-moving feeds where rapid impressions, headlines, images, and perceived source familiarity influence credibility judgments more strongly than systematic fact-checking or deeper source evaluation. As a result, source evaluation, critical thinking, and digital judgment have become increasingly important competencies in modern education.

Educational institutions are expected not only to teach technical digital skills but also to prepare students to critically evaluate information, reflect on credibility, and participate responsibly in digital society. Previous research suggests that practical, interactive learning activities may be more effective than purely theoretical instruction for teaching media literacy and source evaluation [6]. Students benefit from realistic environments where they actively

engage with information and practice identifying manipulative or misleading content.

The study has two objectives: (1) to examine students' ability to distinguish between authentic and AI-generated fake news, and (2) to explore the cues and evaluation strategies they use when assessing the credibility of digital news content.

The project involved the development of a social media-inspired digital platform in which students were presented with both real news articles and AI- manipulated news in an interactive feed. The platform also incorporated gamification elements such as points, streaks, badges, and progression systems to increase engagement and motivation.

The study was conducted using a Design Science Research approach, combining technical system development with empirical user testing and analysis of behavioral log data. A total of 91 students from four upper secondary school classes participated in the testing process. The objective of the study was not only to examine whether students could correctly identify fake news, but also to explore how realistic digital learning environments, AI-generated content, and gamification could help strengthen critical thinking and source evaluation in practice. In addition, the project explores how generative AI can simultaneously represent both a societal challenge and a pedagogical opportunity within education related to media literacy, digital resilience, and cybersecurity.

II. Related Work

The growing prevalence of misinformation and disinformation in digital environments has become a major research topic across media studies, education, information systems, and cybersecurity. The concept of fake news is commonly used to describe false or misleading information presented in a format resembling legitimate journalism or trustworthy reporting. Lazer et al. describe how modern digital media ecosystems enable misinformation to spread rapidly through social platforms where content distribution is largely driven by user engagement rather than editorial verification [7]. Unlike traditional media, social networking platforms allow virtually anyone to publish and distribute information instantly to large audiences, making it increasingly difficult for users to distinguish between verified journalism, advertising, opinion-based content, and intentionally manipulative information.

Researchers frequently distinguish between misinformation, disinformation, and malinformation. Misinformation refers to false information shared without the intention to deceive, while disinformation involves deliberately fabricated or manipulated information distributed to influence or mislead others. Malinformation, in contrast, refers to authentic information used in misleading or harmful contexts. These distinctions are important because they highlight different motivations and mechanisms behind the spread of misleading information and suggest that different educational and technological approaches may be required to address them effectively.

The rise of generative artificial intelligence has significantly intensified concerns related to misinformation. Modern AI models can generate highly realistic text, images, and multimedia content that imitate professional journalism both visually and linguistically. According to the European Union Agency for Cybersecurity (ENISA), AI-generated misinformation increases the risk of scalable and highly convincing influence operations, making digital source evaluation increasingly important in modern society. AI systems can produce manipulated content quickly and at low cost, lowering the barrier for creating large quantities of believable fake news. At the same time, researchers have emphasized that AI should be viewed not only as a threat but also as a potential educational resource that supports learning and critical reflection [6].

Research concerning adolescents' digital media habits further illustrates the relevance of this challenge. The Norwegian Media Authority reports that children and young people spend substantial time on digital platforms, where social media serves as a central source of communication, entertainment, and news [5]. Information presented through algorithm-driven feeds is often consumed rapidly and evaluated based on visual impressions, emotional reactions, or familiarity with the source rather than systematic verification. Pérez-Escoda et al. [8] found that although young users are generally aware that misinformation exists online, they continue to rely heavily on social media for information and news. This creates a paradox in which users are simultaneously skeptical of digital information, yet still depend on the same platforms for everyday access to information.

Several studies have shown that users often rely on heuristics when evaluating online information [4]. Flintham et al. [9] demonstrated that users frequently assess credibility based on headlines, images, source familiarity, and emotional framing rather than reading full articles or conducting deeper fact-checking. Similarly, Jones-Jang et al. [10] found that professionally designed misinformation containing realistic visuals and persuasive headlines may be particularly difficult for young users to identify. These findings indicate that digital literacy requires more than awareness of misinformation; users must also develop practical evaluation skills and reflective decision-making strategies.

Media literacy, source evaluation, and critical thinking have therefore become increasingly important concepts in educational research. López-Meri et al. [11] argue that digital competence involves not only technical skills, but also reflection, analysis, and the ability to critically evaluate information in digital environments. Research further suggests that active, practice-oriented learning approaches are more effective than purely theoretical instruction for developing such competencies. Adjin Tettey demonstrated that participants receiving practical media literacy training became significantly better at identifying fake news and less likely to share misleading information online [6]. These findings emphasize the importance of realistic learning environments in which users actively engage with manipulatives and authentic content.

Gamification has also received increasing attention in research on digital learning environments. Gamification

refers to the use of game-inspired elements such as points, badges, progression systems, streaks, and rewards to increase motivation and engagement [10]. Capecchi et al. found that gamified learning activities addressing misinformation and fake news increased user engagement and encouraged reflection on information credibility and online behavior. Interactive learning environments may therefore contribute to more active participation and sustained motivation compared to traditional lecture-based approaches.

This study builds on previous research by combining AI-generated fake news, gamification, and a realistic, social media-inspired interface into a single learning platform. While earlier studies have often focused on surveys, theoretical discussions, or isolated experiments, this project investigates how students interact with both authentic and manipulated news content in a realistic digital environment that resembles their everyday media experiences. The study, therefore, contributes to existing research on digital literacy, educational technology, and cybersecurity awareness by exploring how generative AI can be used responsibly to strengthen critical thinking and source evaluation among young users.

III. METHODOLOGY

This study was conducted using a Design Science Research (DSR) approach, with the primary objective of designing, developing, and evaluating a technological artifact in a realistic educational context [13]. Design Science Research focuses on the creation and assessment of practical technological solutions while simultaneously contributing knowledge about how such solutions function in practice. The study, therefore, combined system development, user testing, and empirical analysis to investigate how an AI-based learning platform could support source evaluation and critical thinking among upper secondary school students.

The project also adopted characteristics of a mixed methods approach by combining quantitative and qualitative data collection. Quantitative data primarily consisted of automatically generated logs from student interactions with the platform. These data included classifications of news articles as real or fake, response accuracy, selected justifications, progression, streaks, time usage, and navigation patterns. Qualitative data consisted of classroom observations during testing sessions and anonymous student feedback collected through the Mentimeter survey tool after the tests. The combination of behavioral log data and qualitative reflections provided a broader understanding of how students interacted with the platform and evaluated digital news content.

The developed platform served as a social media-inspired news feed, presenting students with a mix of authentic and AI-manipulated news articles. The system architecture consisted of a web-based frontend developed using HTML (Hypertext Markup Language), CSS (Cascading Style Sheets), and JavaScript, combined with Python-based backend scripts and API (Application Program Interface) integrations for data processing and AI-generated content creation. Firebase Firestore was used as the primary database solution for storing news articles, user activity, and log data.

Authentic news articles were automatically collected from RSS feeds provided by established news organizations through a Python script. The original articles were stored in the database and then processed using the Google Gemini language model to generate modified versions of the same content. The AI-generated articles were stored separately from the authentic articles, enabling the platform to dynamically create realistic news feeds containing both real and manipulated news. To further enhance realism, selected articles also included AI-generated or manipulated images produced by generative image models. All generated content was manually reviewed before publication within the platform to remove unrealistic, offensive, or otherwise inappropriate material. Figure 1 illustrates the system workflow. First, authentic news articles are retrieved from RSS (Really Simple Syndication) feeds (1). Selected articles are then manipulated using the Gemini model (2) and stored alongside authentic articles in Firebase Firestore (3). The news feed is presented to users through the frontend interface (4), while user interactions and classifications are logged for later analysis (5).

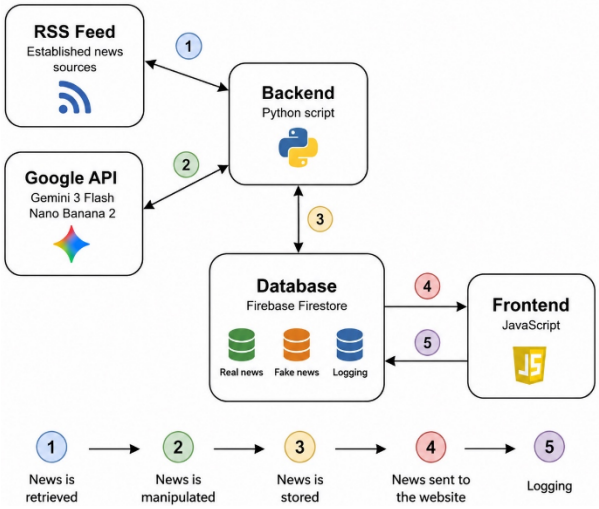

Figure 1. Simplified overview of the platform architecture.

The platform interface was designed to resemble modern social media environments familiar to adolescents. Inspired by platforms such as TikTok, Instagram, Snapchat, and X, the interface presented articles in a continuous feed that users could navigate through scrolling or swipe-based interactions. Gamification elements, including points, streaks, badges, stars, and progression systems, were integrated into the platform to increase engagement and motivation. The user interface is shown in Figure 2.

User testing was conducted with four upper secondary school classes involving a total of 91 students. The tests were conducted in classroom settings and lasted approximately 60 minutes per session. Students first received a shared introduction to the platform and testing procedure before interacting with the system individually. In addition, source evaluation and digital literacy are already part of the

Norwegian school curriculum. Students were encouraged to verify information using external sources and evaluate factors such as source credibility, language, and supporting evidence rather than relying solely on intuition. During the sessions, students evaluated news articles as either authentic or fake and selected two or three justifications supporting their decisions.

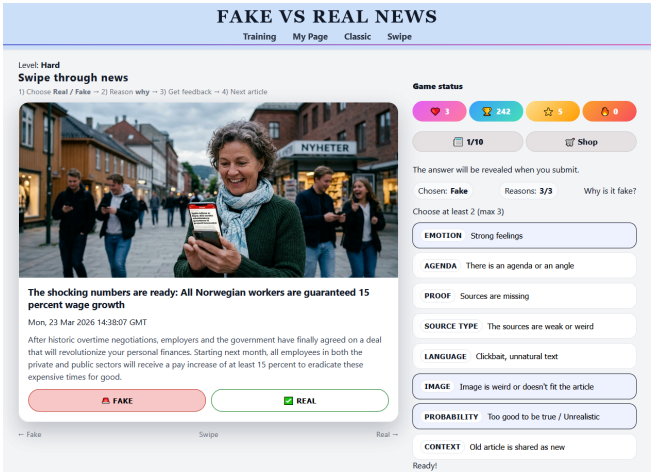

Figure 2. The user interface. Originally in Norwegian, but translated for this paper.

Ethical considerations and privacy protection were central throughout the project. No personally identifiable information was collected, and all participants received randomly generated anonymous user IDs. The platform was password-protected and used exclusively within controlled classroom environments to minimize the risk of distributing AI-generated misinformation outside the educational setting. In addition, all participants were informed that the platform contained both authentic and manipulated news articles as part of a controlled learning activity.

IV. RESULTS

The platform was evaluated through classroom testing involving 91 upper secondary school students from four different classes. The testing sessions were conducted in controlled classroom environments and lasted approximately 60 minutes each. During the sessions, students interacted individually with the platform, where they evaluated news articles presented in a social media-inspired feed containing both authentic and AI-generated fake news articles. User interactions, decisions, progression, and selected justifications were automatically logged for later analysis.

TABLE I. FIELD TRIALS

	School	*Date*	*Students*	*Testing time*
1	Sande High School	12.03.26	16	60 min.
2	Sande High School	12.03.26	27	60 min.
3	Thor Heyerdahl High School	24.03.26	26	40 min.
4	Sande High School	13.04.26	22	60 min.

Overall, the results indicate that students were often able to distinguish between authentic and manipulated news articles, although the difficulty varied considerably depending on the content's design and realism. Articles containing emotionally engaging headlines, realistic images, or references to apparently credible sources were significantly more challenging for students to classify correctly. In several cases, AI-generated fake news articles were perceived as authentic because they imitated the visual style and language typically associated with professional journalism. Authentic news articles were correctly identified in weighted average at approximately 75% of the cases, while AI-generated fake news articles were correctly identified in weighted average at approximately 70% of the cases. Conversely, some authentic news articles were incorrectly classified as fake when the topics appeared unusual, sensational, or emotionally provocative.

The analysis of student justifications revealed several recurring evaluation strategies. Many participants based their decisions on visual and contextual elements such as headlines, language style, source familiarity, and the perceived professionalism of images and layout. Known or recognizable sources were often interpreted as indicators of credibility, while emotionally charged headlines, exaggerated wording, and missing references frequently triggered suspicion. Students also commonly referred to whether the article appeared "realistic" or "trustworthy" rather than relying on systematic fact-checking or external verification. These findings suggest that students frequently use heuristic reasoning and rapid impressions when evaluating information in digital environments.

Figure 3 presents the confusion matrix of students' classifications. The green cells represent correct classifications (true positives and true negatives), while the red cells represent incorrect classifications (false positives and false negatives).

		Student's choice (prediction)		Row total (actual total)
		Chose real	Chose fake	
Actual truth	Actually real	1859 (True Positive) Correctly identified as real	793 (False Negative) Incorrectly identified as fake	2652
	Actually fake	404 (False Positive) Incorrectly identified as real	753 (True Negative) Correctly identified as fake	1157
Column total (predicted total)		2263	1546	3809

Figure 3. Confusion matrix of students' classifications of real and fake news.

The results also showed variation in how students approached the evaluation tasks. Some participants spent considerable time reading articles carefully and reviewing details before making decisions, while others relied primarily on headlines and images, rapidly classifying the content. Log data indicated that longer interaction times were often

associated with more accurate classifications, suggesting that reflective evaluation strategies may improve source evaluation performance. At the same time, some students demonstrated consistent patterns of either skepticism or trust toward nearly all articles, regardless of authenticity. The gamification system included lives, points, stars, and streaks to encourage engagement and continued interaction with the platform. Lives limited the number of incorrect classifications, while points were awarded for correctly identifying both real and fake news articles. Students earned stars for successfully identifying fake news, and streaks tracked consecutive correct classifications to encourage consistent performance and engagement. The implemented gamification elements are illustrated in Figure 4.

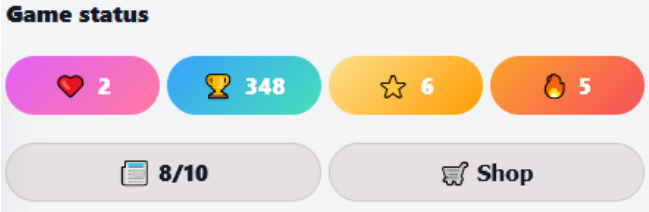

Figure 4. Selected gamification elements used in the platform.

The gamification elements integrated into the platform appeared to contribute positively to student engagement during the testing sessions. Features such as points, streaks, badges, and stars encouraged active participation and motivated students to continue interacting with the platform. Observations from the classroom sessions indicated that many students became increasingly competitive and invested in improving their performance over time. Several students also demonstrated curiosity regarding why particular articles were classified as fake or authentic after receiving feedback from the system.

Student feedback collected after the sessions further supports the value of realistic and interactive learning environments. Many participants reported that the platform was engaging. Several students stated that the activity made them more aware of how difficult it can be to distinguish between authentic and manipulated information online. Others highlighted how realistic AI-generated content challenged their assumptions regarding source credibility and visual trustworthiness.

At the same time, the results also revealed limitations and challenges. Some students appeared to focus more on gameplay elements and progression systems than on careful reflection and source evaluation. In addition, certain AI-generated articles were considered either too unrealistic or too easy to identify, indicating that the quality and balance of generated misinformation remain important for maintaining educational realism. The findings, therefore, suggest that AI-generated educational content requires careful human supervision and iterative refinement to ensure both pedagogical value and ethical responsibility.

Overall, the results indicate that AI-supported and gamified learning environments may offer valuable opportunities to strengthen source evaluation and critical thinking among young users. The findings also highlight the growing importance of practical training environments where students actively engage with realistic misinformation rather than learning about the phenomenon only theoretically.

V. Discussion

The findings from this study suggest that realistic and interactive digital learning environments may contribute positively to students' ability to critically evaluate online information [4]. Most participants correctly identified a substantial number of both authentic and AI-generated fake news articles, indicating that many students already had some awareness of misinformation and source evaluation. At the same time, the results demonstrated that realistic fake news articles remained difficult to detect when they included convincing headlines, emotionally engaging language, realistic imagery, or references to seemingly credible sources. These findings reflect broader societal challenges associated with modern digital media environments, where manipulated information is increasingly sophisticated and visually convincing.

One important observation from the study is that students frequently relied on rapid impressions and heuristic decision-making when evaluating content. Headlines, images, language style, and perceived source familiarity appeared to influence credibility assessments more strongly than detailed analytical reasoning or systematic fact-checking. This behavior is consistent with earlier research showing that users often evaluate information quickly in social media environments characterized by high information volume and continuous scrolling. The platform's feed-based interface, therefore, appears to have successfully simulated the digital environment in which young people commonly encounter information in everyday life. By reproducing realistic social media interaction patterns, the project increased ecological validity and provided insight into how students evaluate information in practice rather than under highly artificial testing conditions.

The study further indicates that practical, experience-based learning activities may strengthen reflection and engagement in source evaluation. Instead of receiving purely theoretical instruction about misinformation, students actively interacted with authentic and manipulated news content and were required to justify their decisions. This aligns with earlier studies suggesting that media literacy training is more effective when users actively practice evaluating information in realistic scenarios. The requirement that students provide justifications for their classifications may have encouraged more reflective decision-making and made students more conscious of the criteria they used when evaluating credibility.

The gamification elements implemented in the platform also appeared to contribute positively to engagement and motivation. Features such as points, streaks, badges, stars, and progression systems encouraged active participation throughout the testing sessions. Observations during the classroom sessions suggested that many students became

increasingly invested in the activity and demonstrated curiosity regarding why some articles were authentic while others were manipulated. Gamification may therefore help transform source evaluation from a purely academic exercise into a more engaging and interactive learning activity. However, the study does not isolate the specific effects of gamification from the broader platform design, so the motivational impact cannot be measured independently of the realistic feed environment and AI-generated content.

An important contribution of the project is the demonstration that generative AI can function simultaneously as both a societal challenge and an educational opportunity. Modern AI models can generate highly realistic misinformation at scale, representing an increasing concern for democratic processes, digital trust, and cybersecurity. However, the same technology can also be used constructively in controlled educational settings to create dynamic and realistic learning materials. In this project, AI enabled the automatic generation of manipulated news articles based on authentic news stories, making it possible to rapidly produce varied and realistic training scenarios. This would have been significantly more time-consuming using fully manual approaches.

At the same time, the study highlighted the importance of human oversight and ethical control when using generative AI in educational contexts. All AI-generated articles and images were manually reviewed before publication to remove inappropriate, unrealistic, or potentially harmful material. This human-in-the-loop approach proved important both for quality assurance and for reducing the risk of unintentionally distributing harmful misinformation. The findings therefore support previous arguments that AI systems should augment rather than replace human judgment in educational and information-related contexts.

The study also has several limitations. First, the testing sessions were relatively short and focused primarily on short-term interactions rather than long-term learning outcomes. It therefore remains uncertain whether repeated exposure to similar learning activities would produce lasting improvements in critical thinking and digital source evaluation. Second, the participant group consisted of only 91 students from four upper secondary school classes, limiting the generalizability of the findings. The platform was also limited to text-based articles and static images, while contemporary misinformation increasingly includes video, audio, deepfakes, and short-form social media content.

Despite these limitations, the study demonstrates the potential of combining AI-generated content, gamification, and realistic digital interfaces to support critical thinking and source evaluation among young users. The findings further suggest that digital literacy and cybersecurity are becoming increasingly interconnected, as the ability to critically evaluate information may represent an essential component of digital resilience in modern societies.

VI. CONCLUSION

This study investigated how an AI-based learning platform can help upper secondary school students distinguish between authentic and fake news in digital media environments. The project combined artificial intelligence, gamification, and social media-inspired design to create a realistic and interactive learning environment where students actively evaluated news credibility and reflected on their decisions.

The findings indicate that many students were able to identify both authentic and manipulated news articles, although realistic AI-generated misinformation could still be difficult to detect. Students frequently relied on visual impressions, headlines, language style, and perceived source credibility when evaluating content. These findings illustrate how information is often consumed in modern digital environments and highlight the importance of strengthening critical thinking, source evaluation, and digital judgment among young users.

The study also demonstrates that generative AI can serve as both a societal challenge and a pedagogical opportunity. While AI increases the ability to produce convincing misinformation at scale, the same technology can be used in controlled educational settings to create realistic training scenarios that support active learning and reflection. The project further showed that gamified and interactive learning activities may increase engagement and motivation compared to traditional theoretical approaches to media literacy education.

From a methodological perspective, the project demonstrates the usefulness of a Design Science Research approach for developing and evaluating educational technology solutions in realistic contexts. By combining technical development, classroom testing, log-data analysis, and qualitative feedback, the study provided insights into both user behavior and system design.

At the same time, the study has limitations. The testing sessions were short and focused on short-term interactions rather than long-term learning outcomes. In addition, the participant group was relatively small and limited to upper secondary school students. Future research should therefore investigate long-term educational effects, broader participant groups, and additional media formats such as video, audio, and short-form social media content.

Overall, the study suggests that realistic digital learning environments, supported by AI and gamification, may contribute to improved reflection and awareness regarding misinformation and digital source evaluation. As misinformation and AI-generated content continue to evolve, educational approaches that combine technology, critical thinking, and practical training may become increasingly important for strengthening digital resilience and informed participation in society.

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