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Counteracting fake news as a factor in the development of professional competencies of future journalism students

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ABSTRACT

The purpose of this study is to assess the impact of training in countering fake news on the development of professional competencies among journalism students. This research provides a structured pedagogical framework for teaching fact-checking and critical thinking. Using a quasi-experimental design at Toraighyrov University (n=190), the study compared an experimental group (EG) with a control group (CG) across three phases: diagnostic, instructional, and evaluative. Results from the 2024 final testing demonstrate significant efficacy: the EG showed a 64% increase in critical thinking, news analysis, fact-checking, vastly outperforming the 11% growth in the CG. Qualitative data further confirmed a marked reduction in trust toward unverified sources. These findings offer a scalable model for journalism education, proving that targeted instructional interventions are highly effective for developing professional competencies in media content evaluation.

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1. INTRODUCTION

The rapid digital transformation of the media environment has substantially changed the conditions of journalistic production and dissemination, contributing to the growing complexity of misinformation and fake news phenomena. For contemporary journalism, the ability to verify information and counter disinformation has become a core professional competence rather than an auxiliary skill. This challenge necessitates systematic curricular development in journalism education, particularly through structured pedagogical approaches to fact-checking and critical analysis [1].

Research shows that fake news significantly shapes public opinion on digital platforms**,** even though it does not dominate overall media content [2]. The democratization of content production – where any user can create and distribute information – combined with transmedia virality enables the rapid spread of misleading narratives and weakens traditional mechanisms of editorial control. Together, these processes place increased responsibility on journalists as professional mediators of information and underscore the need for targeted educational interventions [3]. At the same time, transmedia dynamics and platform-based news consumption have reshaped journalistic practices [4], requiring journalism education to integrate verification skills, critical thinking, and digital literacy into their curricula [5]. Although journalism students tend to have

higher media literacy than the general public**,** studies reveal considerable variation in their grasp of fundamental concepts such as truth, objectivity, and responsibility. Moreover, traditional journalism curricula often fail to prepare students for the speed, scale, and algorithm-driven logic of contemporary information dissemination [6]. In Kazakhstan, these challenges are especially salient: social media has become a primary news source in a multilingual environment, and audiences are increasingly vulnerable to misinformation and manipulation [7]. The spread of fake news poses risks not only to journalistic credibility but also to social stability and public trust in institutions. In such a context, journalism education must move beyond a traditional transmission-oriented model toward a competency-based, society-oriented approach. Curricula should integrate structured fact-checking and misinformation analysis modules to equip future journalists with the critical thinking, verification, and ethical skills needed to counter information disorder [8].

Indeed, the tension between competency-based and traditional transmission-oriented approaches has intensified in recent years. While transmission models emphasize content delivery and technical skills acquisition, competency-based frameworks prioritize adaptive capacities, critical thinking, and real-world problem-solving. A 2025 study examining artificial intelligence (AI) integration in journalism education revealed that competency-based curricula better prepare students for rapidly evolving newsroom environments where AI tools are becoming standard practice [9]. These findings underscore the need for journalism programs to move beyond mere knowledge transmission and instead cultivate epistemic vigilance and analytical resilience. This shift is particularly crucial as AI-generated content and deepfake technologies increasingly complicate verification practices [10]. Newsrooms worldwide are embracing AI tools to improve efficiency while grappling with concerns about job displacement and concentrated technological power, a trend that reinforces the imperative for journalism curricula to integrate AI literacy with critical verification skills [11]. Deepfake technology poses an especially acute challenge to verification, and a recent study found that journalists are widely concerned about deepfakes' potential to undermine public trust despite acknowledging some benign uses (e.g., satire) [12]. Moreover, a UNESCO report warns that deepfakes threaten entire information ecosystems, calling for educational responses that go beyond technical detection and cultivate broader metacognitive literacy [13].

Fact-checking has evolved from a supplementary journalistic practice into a core professional competency. Recent educational research demonstrates that structured fact-checking instruction – such as training in lateral reading techniques – significantly enhances students' ability to verify claims and detect misinformation [14]. However, even journalism students who are aware of disinformation exhibit notable gaps in their applied verification skills. Scholars emphasize that professional fact-checking methods require adaptation into pedagogical tools, underscoring the need for scaffolded instructional designs that translate newsroom practices into teachable exercises [15]. However, there remains a significant research gap: few studies have experimentally evaluated the effectiveness of structured pedagogical interventions for developing journalism students' fake news detection competencies. Many journalism programs address misinformation only in a general or theoretical manner, without systematically testing targeted fact-checking training modules or examining factors that affect students' verification effectiveness. Accordingly, this study was guided by the following research question and hypothesis, research questions were as: does training in fact-checking and critical thinking significantly improve journalism students' ability to detect and analyze fake news? Hypothesis (H1): journalism students who complete structured training in countering fake news will demonstrate reduced susceptibility to manipulative content and increased analytical persistence, which together will be associated with a significant improvement in critical thinking, news analysis, and fact-checking proficiency.

2. METHOD

2.1. Participants and sampling

The study was conducted at Toraighyrov University (Kazakhstan) across several student cohorts and included a total of N=190 undergraduate students aged 18-20, 93 females and 97 males. Participants were allocated to two conditions: an experimental group (EG; n=95) that completed a structured training module on counteracting fake news, and a control group (CG; n=95) that followed the standard curriculum without additional instruction, as shown in Table 1.

Table 1. Description of study participants

Cohort	Year of study	N	Year of the experiment
A	1st year (journalism)	46	2020
B	3rd year (humanities disciplines (historians, lawyers, political scientists, sociologists)	64	2020
C	1st year (journalism)	80	2022
	Total	190	

2.2. Design and procedure

Diagnostic stage (pre-intervention): baseline assessment of i) critical thinking, ii) news analysis, and iii) fact-checking skills, alongside psychological measures (perseverance; susceptibility to manipulation) and a survey on exposure to fake news, trust in sources, and verification habits. Educational stage (intervention): EG completed the module "fake news, fact-checking, methodology and tools" combining conceptual instruction and practical verification exercises, as in Table 2. CG continued the standard curriculum without additional instruction. Evaluation stage (post-intervention): the same competency-based tests were re-administered, followed by a follow-up survey and semi-structured interviews with students/instructors. Participants were assigned to EG or CG using computer-generated random numbers. Baseline equivalence of groups was checked by comparing pretest scores on critical thinking, news analysis, and fact-checking.

2.3. Measures

Students completed a competency test consisting of 20 items rated on a 5-point scale (maximum score 100), assessing critical thinking, news analysis, and fact-checking. Perseverance was assessed using the Ilyin and Feshchenko test [16] (α=0.82), and susceptibility to manipulation was measured using Burenina's test [17] (α=0.78). Internal consistency for competency-based subtests was reported as α=0.85 (critical thinking), α=0.81 (news analysis), and α=0.79 (fact-checking). Perseverance is considered as one of the key components of professional resilience and self-regulation in journalism education. Recent studies demonstrate that higher perseverance is associated with resistance to external pressure and manipulative influence [18]. Surveys assessed exposure to fake news, trust in information sources, and verification habits; semi-structured interviews captured participants' reflections on learning and implementation.

2.4. Intervention

The educational module comprised theoretical instruction on misinformation mechanisms and typologies, guided analysis of authentic and fake news cases, hands-on training in verification tools (e.g., Google Fact Check Explorer, reverse image search tools, YouTube Data Viewer, and geolocation tools), and student-led verification projects applying open source intelligence (OSINT) and metadata-based checks, as shown in Table 2.

Table 2. Structure of the educational module "fake news, fact-checking, methodology and tools"

Component	Activities	Tools/methods	Expected outcomes
Theoretical foundations	Lectures on disinformation mechanisms, fake news typology, and dissemination pathways	PowerPoint presentations, historical case examples	Understanding of fake news concepts and manipulation techniques
Practical analysis	Analysis of real fake news cases from social media, television, and online platforms	Group discussions, comparative analysis worksheets	Ability to identify manipulative headlines, emotional biases, and fabricated content
Fact-checking tools training	Hands-on practice with verification platforms	Google Fact Check Explorer, Snopes, TinEye, Google Reverse Image Search, YouTube Data Viewer, Pic2Map	Proficiency in using digital tools for source verification and image authentication
Case studies	Examination of media manipulation scandals and information warfare examples	Interactive seminars, role-playing scenarios	Critical evaluation of media ideology, citation practices, and semantic coherence
Independent assessment	Student-led verification projects on current news stories	OSINT methodologies, metadata analysis tools, FactCheck.org	Application of fact-checking skills in real-world contexts

2.5. Data analysis, ethics, and limitations

Post-test group differences were assessed using analysis of covariance (ANCOVA), with pretest scores entered as covariates. ANCOVA is particularly useful when examining the influence of a categorical independent factor on a continuous dependent variable while controlling for continuous covariates. This method increases the accuracy of estimates and allows for more precise conclusions regarding the relationship between independent and dependent variables. Key assumptions – linearity, homogeneity of regression slopes, normality of residuals, and homogeneity of variance – were verified prior to analysis.

Participation was voluntary, with no financial compensation provided. Anonymity was guaranteed, and informed consent was obtained from all participants. All data were stored and processed securely in accordance with data protection requirements to prevent unauthorized access or disclosure.

Several limitations should be acknowledged. First, the study was conducted at a single educational institution, which may limit the generalizability of findings to other contexts. Second, the sample included not only journalism students but also students from other humanities majors for whom fact-checking and

critical thinking competencies are supplementary rather than primary professional skills. Third, individual differences among students – including prior knowledge, cognitive abilities, motivation, and previous media literacy experience – may have influenced outcomes. Future research should expand to multiple institutions with larger, more homogeneous samples and employ longitudinal designs to examine long-term retention of fact-checking and critical thinking skills, as well as their application in professional practice.

3. RESULTS

Media and socio-economic transformations have affected the approaches used in journalism training. The course titled fake news, fact-checking, methodology, and tools is based on the modern professional requirements for journalists. To determine the tool's effectiveness, the levels of susceptibility to manipulations and perseverance were evaluated. The perseverance test developed by Ilyin and Feshchenko [16], made it possible to establish the perseverance level of future journalists before and after the course implementation, as presented in Figure 1. The figure shows that there are only minor upward and downward changes in the CG, which did not participate in the experimental program.

The results of the experiment allowed for the classification of the participants into three groups based on their level of perseverance. When comparing the experiment data, it was found that the proportion of high and medium perseverance levels increased (from 13% to 22% for high levels and from 47% to 62% for medium levels). Conversely, the percentage of low indicators decreased from 40% to 20%. In other words, initially, 40% of the participants of the EG exhibited a low level of perseverance. However, after the program, this number decreased to 20%, indicating positive changes in strengthening perseverance. Thus, the results suggest that perseverance contributes to the effective application of verification skills. A high level of perseverance contributes to successful resistance against fake news, whereas a low level of this quality limits effective resistance to misinformation. The obtained empirical evidence highlights a trend toward both optimizing perseverance and enhancing the competencies. Susceptibility to manipulation test yielded the following results, as seen in Figure 2.

Figure 2 indicates that the course allowed the EG to improve recognition of manipulation and hidden psychological influences, increasing from 16% to 40% (resilience to manipulation in the EG). The analysis revealed a correlation between the critical perception of messages, the comprehension of received information, and its interpretation. These results correlate with data from other studies highlighting the importance of perseverance in the professional context of journalism.

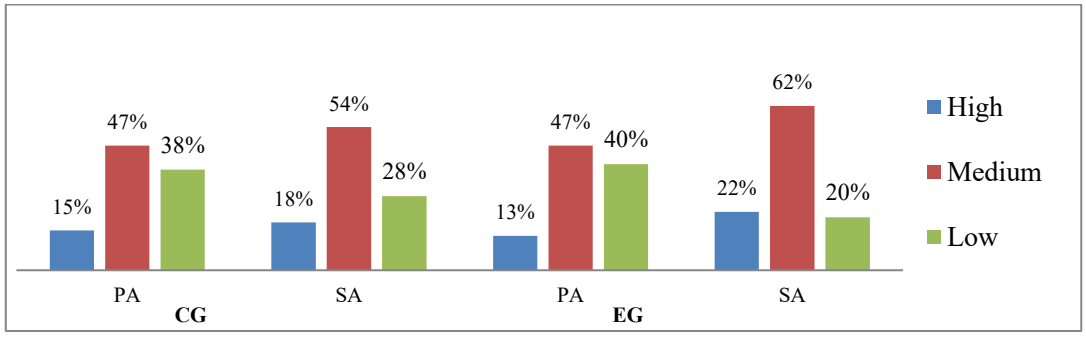

Figure 1. Dynamic pattern of primary and secondary assessments of CG and EG [16]

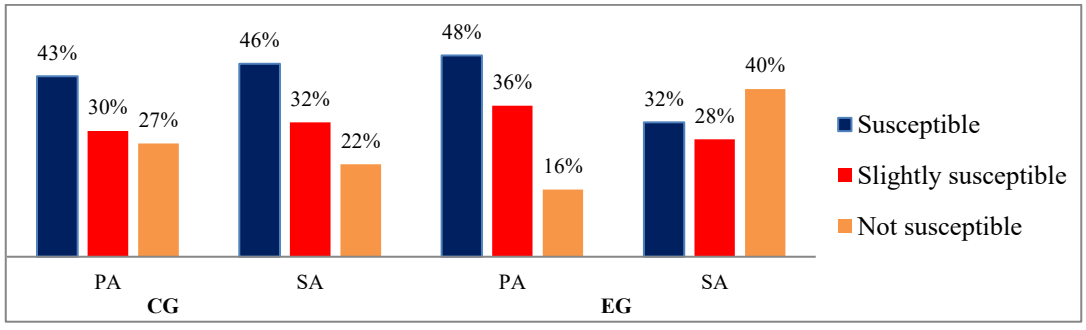

Figure 2. Dynamic pattern of primary and secondary assessments of CG and EG (the susceptibility to manipulation test developed by Burenina [17])

Statistical analysis of the baseline data (pre-test) confirmed that the levels of critical thinking, news analysis, and fact-checking competencies were moderate and approximately equivalent across both groups. Subsequent post-test results demonstrated a significant upward trend in these metrics, indicating a substantial improvement in performance following the training intervention, as seen in Table 3. All baseline differences are small (CT 0.4 (D), NA 0.5 (D), FC 0.7 (D), Final 1.6 (D) points. The EG improved by +29.6 points on final (+64.1% (D)), and CT/NA/FC gains of +7.2 (+47.4% D), +11.2 (+60.9% D), +11.2 (+88.9% D) respectively. Psychological shifts (perseverance high 13→22 (M); non-susceptibility 16→40 (M)) are also noted. These patterns support H1.

Table 3. Results of the entrance testing and final testing (average scores by group)

Outcome	EG pre (M/D)	EG post (M)	Δ (M)	% change (D)	CG pre (M/D)	CG post (M)	Δ (M)	% change (D)
Final	46.2 (D)	75.8 (M)	+29.6 (M)	+64.1 (D)	44.6 (D)	49.5 (M)	+4.9 (M)	+11.0 (D)
Critical thinking	15.2 (D)	22.4 (M)	+7.2 (M)	+47.4 (D)	14.8 (D)	16.2 (M)	+1.4 (M)	+9.5 (D)
News analysis	18.4 (D)	29.6 (M)	+11.2 (M)	+60.9 (D)	17.9 (D)	19.8 (M)	+1.9 (M)	+10.6 (D)
Fact-checking	12.6 (D)	23.8 (M)	+11.2 (M)	+88.9 (D)	11.9 (D)	13.5 (M)	+1.6 (M)	+13.4 (D)

4. DISCUSSION

The development of skills in countering fake news among future journalists correlates with their professional perseverance and resistance to manipulation. This synergy enables students to become "persistent skeptics" capable of self-regulation and decisive action in volatile information environments. As professional competence in journalism is inherently linked to the critical validation and arrangement of information [19], the escalating scope of manipulative media necessitates the immediate integration of fact-checking modules into higher education.

Research underscores the urgency of modernizing journalism curricula through active learning. The effectiveness of case technologies lies in their problem-oriented nature. By simulating real-world professional challenges, these methods foster critical thinking and decision-making – skills that traditional transmission models often fail to develop [20]. Specifically, our findings align with global precedents, such as the news literacy courses [21] and gamified approaches where structured interventions led to a significant decrease in susceptibility to disinformation regardless of the students' background [22].

International experiences [23] further validate that digital verification proficiency is contingent on emotional intelligence and the ability to evaluate electronic sources effectively. Our study confirms that a conscious attitude toward fakes correlates with the media literacy scale, supporting the findings [24], [25] regarding the need for specialized skill sets in both online and offline educational contexts. The shift from superficial learning to an in-depth, interdisciplinary understanding – often referred to as "epistemic vigilance" – is crucial. This approach, involving integrated and binary lessons, allows students to perceive logical connections between disciplines and adapt to a changing professional landscape. In post-truth conditions, the ability to independently analyze and compare various information sources becomes a vital component of a journalist's research thinking [26]. Ultimately, the results suggest that creating specific psychological and pedagogical conditions through original elective courses allows students to develop the necessary social immunity in a digital environment [27]. The primary task of modern university education is thus to form a holistic information worldview capable of resisting media aggression and distorted truths.

5. PEDAGOGICAL IMPLICATIONS

The results of this study necessitate a fundamental re-evaluation of current pedagogical approaches within the broader landscape of higher education. The significant progress observed in the EG suggests that the development of analytical competencies must transition from a discipline-specific skill set to a universal model of "epistemic vigilance" applicable across all humanities and social sciences. This implies that modern pedagogy should prioritize the integration of cognitive psychology tools, enabling students – regardless of their major – to recognize their own heuristic biases and emotional triggers before engaging with complex digital information.

Furthermore, the findings indicate that fostering psychological resilience and volitional qualities, such as perseverance, is as critical as technical proficiency in information retrieval. In the context of the rapidly evolving information environment, educational strategies must move toward immersive, simulation-based learning that mirrors the high-pressure conditions of contemporary digital discourse. This approach ensures that future specialists are not merely passive consumers of content, but active, resilient evaluators of information integrity, which is essential for maintaining social stability and informed citizenship in an era of automated disinformation.

6. CONCLUSION

This study investigated the impact of a structured educational intervention on the development of professional competencies among future journalists, with a specific focus on counteracting fake news. The research confirms that the integration of specialized modules into the journalism curriculum leads to a statistically significant improvement in critical thinking and digital verification skills. The EG demonstrated 64% increase in the overall final score, supported by specific gains in critical thinking (47.4%), news analysis (60.9%), and fact-checking proficiency (88.9%), thereby answering the primary research objective by proving the high efficacy of the proposed pedagogical framework. These findings suggest that professional competence in the modern media landscape is deeply rooted in the synergy between technical verification tools and psychological resilience.

The implications of this study extend beyond the immediate academic environment, suggesting a model for curriculum modernization in the "post-truth" era. By linking cognitive analysis with volitional qualities such as perseverance, this research provides a validated strategy for fostering "epistemic vigilance" among students. Furthermore, the scalability of this model allows for its potential implementation across various humanities and social science disciplines. This broader application is essential for protecting the integrity of public discourse and enhancing the overall information literacy of content consumers in a digitally saturated society.

Despite the positive outcomes, several limitations of this study must be acknowledged to ensure a balanced interpretation of the results. The research was primarily conducted at a single institution with a specific sample size, which may limit the broad generalization of the findings to diverse international educational contexts. Additionally, the current instruments focused on immediate post-instructional gains, leaving the long-term retention of these skills unexamined. Future studies should therefore focus on cross-country comparisons and longitudinal designs to track professional practice outcomes over several years.

Subsequent inquiries should explore the integration of AI-based detection tools and adaptive learning systems to personalize fact-checking instruction. There is also a critical need for interdisciplinary investigation into the ethical dimensions of using AI-assisted technologies in journalism education. In summary, this study demonstrates that structured fake news training is not only effective but essential for preparing journalists and protecting society against increasingly sophisticated disinformation threats.

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This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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Nataliia Fominykh			✓	✓		✓			✓					✓
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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
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CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board (Ethics Committee of Toraighyrov University; Protocol No. 6 of 13.02.2023).

DATA AVAILABILITY

The authors confirm that the data supporting the findings of this study are available within the article [and/or its supplementary materials].

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