

FORMING STUDENTS' SKILLS IN EVALUATING THE RELIABILITY OF INFORMATION IN INTERNET SOURCES

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Abstract. University students increasingly rely on internet sources for academic work, yet many of them judge online information by its appearance, popularity or position in search results. This article addresses the pedagogical problem of forming students' skills in evaluating the reliability of information in internet sources, with a focus on English-language content used in foreign language education. On the basis of the civic online reasoning research, the SIFT method and the concept of lateral reading, the author defines the structure of the skill (motivational, cognitive, operational and reflective components), develops criteria and levels of its formation, and proposes a four-stage methodology. The methodology was tested with 54 undergraduate students over one semester using a pre-test/post-test design with five performance tasks based on authentic web materials. The mean composite score increased from 9.8 to 16.4 out of 25 ($t(53) = 12.41$, $p < .001$, $d_z = 1.69$). The share of students at the proficient and advanced levels grew from 19% to 63%, and the proportion of students who first verified an unknown site by leaving it (lateral reading) rose from 7% to 48%. The findings demonstrate that the skill can be formed purposefully when students practise short, repeated verification routines on authentic internet materials and reflect on their own evaluation decisions.

Keywords: *internet sources, information reliability, lateral reading, SIFT, civic online reasoning, misinformation, university students, foreign language education*

1. INTRODUCTION

The internet has become the first and often the only place where students look for information. Search engines, social networks, video platforms and, more recently, AI chatbots provide instant answers, but they do not guarantee that these answers are accurate. Research on misinformation shows that false news spreads faster and further than true news on social media (Vosoughi, Roy & Aral, 2018), and that people often share content without thinking about its accuracy (Pennycook & Rand, 2019). For students, whose academic writing and professional future depend on the quality of information they use, the ability to evaluate internet sources is a critical learning outcome.

Large-scale assessments consistently reveal a gap between students' confidence and their actual skills. The Stanford History Education Group found that students at all levels had difficulty distinguishing advertisements from news, identifying who stood behind a website and evaluating evidence in social media posts (Breakstone et al., 2021). University students show similar weaknesses: they often trust search engine ranking, domain names and professional design instead of examining who stands behind a source (McGrew et al., 2018). In foreign language education the challenge increases: students work with English-language sources whose cultural and institutional context may be unfamiliar to them, and limited reading fluency can make verification seem too time-consuming.

Although evaluating sources is mentioned in national educational standards and international frameworks, the pedagogical mechanism of forming this skill, i.e., its structure, criteria, levels and stages, is insufficiently elaborated, especially for students of foreign languages. The aim of this study is to define

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the structure of the skill of evaluating the reliability of internet information, to develop a methodology for its formation, and to test its effectiveness.

1.1. Theoretical basis

Two traditions of source evaluation are relevant. The first, *checklist-based*, asks students to examine a page against criteria such as currency, authority, accuracy and purpose (Blakeslee, 2004). The second, *lateral reading*, is based on the observation that professional fact-checkers spend little time on an unfamiliar website and instead open new tabs to find out what other reliable sources say about it (Wineburg & McGrew, 2019). Caulfield (2019) operationalised this approach as the SIFT method (Figure 1), which has proved effective in intervention studies with university students (McGrew et al., 2019; Brodsky et al., 2021).

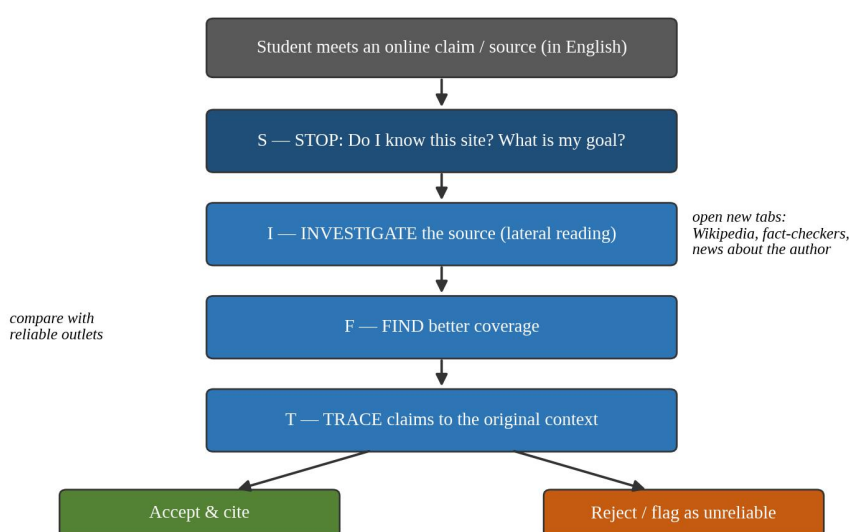


Figure 1. Algorithm of evaluating an internet source based on the SIFT method and lateral reading (after Caulfield, 2019)

Research on cognitive "boosts" (Kozyreva, Lewandowsky & Hertwig, 2020) adds that students benefit from knowing typical manipulation techniques, such as emotional language, false experts and misleading visuals. Combining these perspectives, the skill of evaluating the reliability of internet information is defined in this study as *a student's integrative ability to recognise the need for verification, to apply efficient strategies for checking the source, the claim and the evidence, and to make and justify a reasoned judgement about the trustworthiness of online information*. Its structure, criteria and indicators are presented in Table 1.

Table 1. Structure of the skill: components, criteria and indicators

Component	Criterion	Indicators
Motivational	Need for verification	Shows interest in the accuracy of information; stops before sharing; recognises personal responsibility
Cognitive	Knowledge of reliability criteria and manipulation	Knows types of information disorder, CRAAP criteria, signs of sponsored content and manipulative headlines

Component	Criterion	Indicators
	techniques	
Operational	Mastery of verification strategies	Reads laterally; uses search operators and fact-checking resources; traces claims and images to the original
Reflective	Justification and self-control	Explains the judgement with evidence; recognises own biases; evaluates the efficiency of own actions

Because the participants were students of a foreign language, special attention was paid to the language of manipulation. Table 2 lists the typical techniques of unreliable internet content that were taught in the cognitive-informational stage, together with the English-language markers that help students recognise them.

Table 2. *Typical manipulation techniques in internet content and their language markers*

Technique	Description	English-language markers (examples)
Emotional appeal	Content provokes fear, anger or outrage to bypass reasoning	shocking, outrageous, you won't believe, terrifying
False authority	Unqualified or anonymous "experts" presented as authoritative	experts say, scientists warn (no names or links)
Overgeneralisation	Absolute claims without evidence or limits	always, never, everyone knows, 100% proven
Sponsored content disguised as news	Advertising presented in journalistic form	sponsored, partner content, presented by, promoted
Decontextualised visuals	Real images or videos reused with a false caption	this photo shows..., just now, breaking (with old image)
Clickbait headline	Headline promises more than the text delivers	this one trick, what happened next, the truth about

2. MATERIALS AND METHODS

The study was carried out during the spring semester at a state university in Uzbekistan. Participants were 54 second- and third-year undergraduate students (foreign language and literature programme, English proficiency B1–B2, 41 female and 13 male). A one-group pre-test/post-test design was chosen because the methodology was integrated into a compulsory course taught to all groups of the cohort. All participants gave informed consent.

The methodology was implemented over 14 weeks in four stages: (1) *motivational-diagnostic* (weeks 1–2) — discussion of real cases of online misinformation, self-assessment and diagnostic testing; (2) *cognitive-informational* (weeks 3–5) — study of reliability criteria, types of information disorder and

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linguistic markers of manipulation; (3) *operational-practical* (weeks 6–11) — regular 10-minute "verification warm-ups" using the SIFT moves, WebQuests, reverse image search and comparison of English-language sources; (4) *reflective-evaluative* (weeks 12–14) — mini-projects in which students fact-checked a viral claim and presented their verification process.

A typical verification warm-up lasted 10 minutes. Students received a link or screenshot (for example, a website offering "independent research" on the health effects of energy drinks) and had three minutes to decide, working in pairs, whether it could be used as a source for an academic essay. They were required to open at least two additional tabs, to note what other sources said about the organisation behind the site, and to report their verdict in English using a fixed frame: "We checked... We found that... Therefore, the source is / is not reliable because...". The teacher then modelled the expert solution, thinking aloud, so that students could compare their own route with the most efficient one.

The assessment instrument consisted of five performance tasks modelled on the Civic Online Reasoning assessments (McGrew et al., 2018): identifying sponsored content, evaluating evidence in a social media post, checking a viral image, comparing the trustworthiness of two websites, and detecting a manipulative headline. Each task was scored from 1 to 5 (maximum composite score 25). A score of 4–5 on a task was considered *mastery*. Composite scores were converted into four levels: emerging (5–9), developing (10–14), proficient (15–19) and advanced (20–25). In addition, screen observations of the first action taken when opening an unfamiliar site were recorded. Two raters scored the tasks ($\kappa = .83$). A paired-samples t-test and the Wilcoxon signed-rank test were used.

3. RESULTS

The composite score increased significantly after the intervention (Table 3). All five tasks showed statistically significant improvement, with large effect sizes.

Table 3. Pre-test and post-test results ($N = 54$)

Task	Pre M (SD)	Post M (SD)	t(53)	p	dz
1. Identify sponsored content	1.81 (0.92)	3.44 (1.01)	9.37	< .001	1.28
2. Evaluate evidence in a post	2.02 (0.88)	3.26 (0.96)	7.84	< .001	1.07
3. Check a viral image	1.54 (0.79)	3.02 (1.12)	8.91	< .001	1.21
4. Compare two websites	2.17 (0.94)	3.39 (0.89)	7.52	< .001	1.02
5. Detect a manipulative headline	2.26 (0.97)	3.29 (0.91)	6.48	< .001	0.88
Composite score (max 25)	9.80 (3.62)	16.40 (3.81)	12.41	< .001	1.69

Note. dz = Cohen's effect size for paired samples.

Figure 2 illustrates the redistribution of students across levels. Before the intervention, 81% of students were at the emerging or developing level; after it, 63% reached the proficient or advanced level (Wilcoxon $Z = -5.87$, $p < .001$). Only five students remained at the emerging level; the observation data suggest that they had lower English reading fluency and irregular attendance.

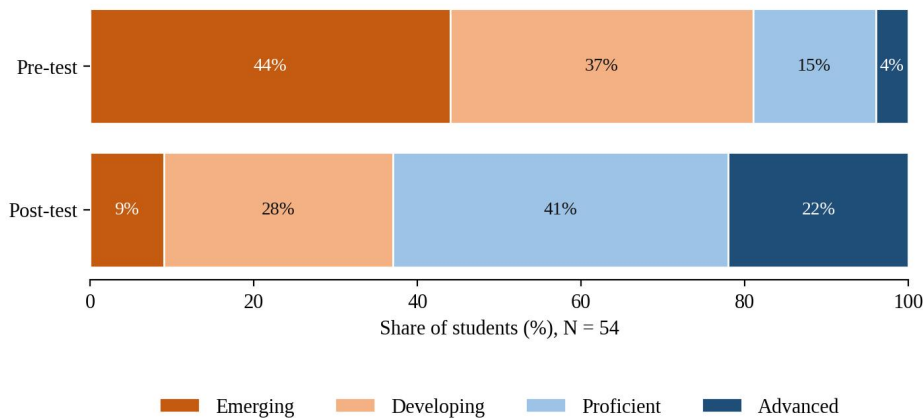


Figure 2. *Distribution of students by level of skill formation before and after the intervention*

Figure 3 presents the proportion of students reaching mastery on each task. The weakest area at the pre-test was checking a viral image (11%), which improved to 49% after students learned to use reverse image search and to trace images to their original context. The highest post-test result was in detecting manipulative headlines (74%), which benefited from the language-focused analysis of emotive and absolute expressions.

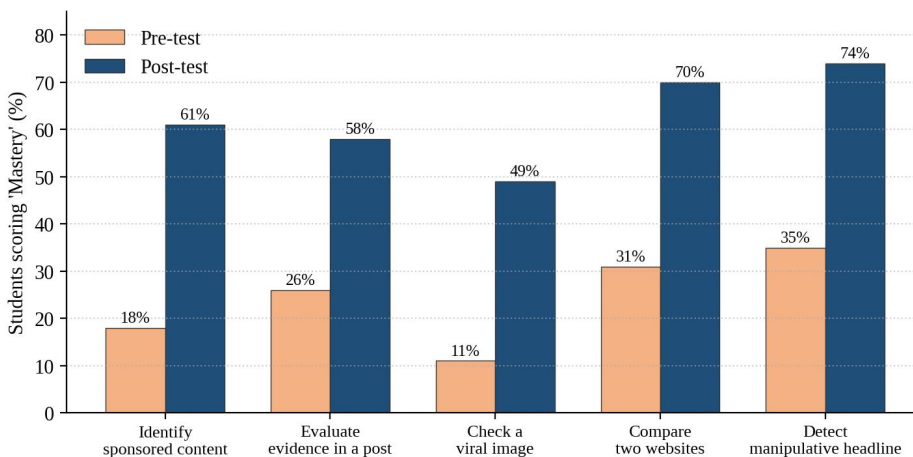


Figure 3. *Share of students reaching mastery (score 4–5) on each task*

The observation of students' first action when meeting an unfamiliar website (Figure 4) showed a qualitative shift in strategy. At the pre-test, more than half of the students started reading the page itself (vertical reading) and 18% accepted it without any check. After the intervention, almost half of the students first left the site to look for information about it — the core move of lateral reading.

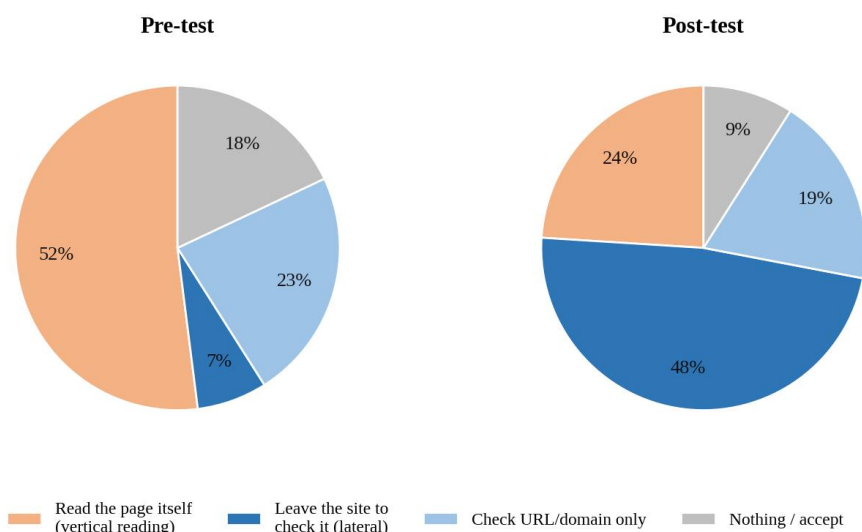


Figure 4. *Students' first action when evaluating an unfamiliar website (% of students)*

Students' written reflections (N = 54) supported the quantitative findings. Most frequently, students wrote that they had become "more careful before sharing" (38 students) and that they now "check who is behind a website first" (31 students). Several students noted that verification in English expanded their vocabulary of media and academic discourse, and that they began to apply the same routines to Uzbek- and Russian-language content, which indicates transfer of the skill beyond the English lesson.

4. DISCUSSION

The results confirm that the skill of evaluating the reliability of internet information can be purposefully formed within one semester when its structure and stages are made explicit. The magnitude of improvement is comparable to that reported in intervention studies with American university students (McGrew et al., 2019; Brodsky et al., 2021), which suggests that lateral reading and SIFT are transferable to a different cultural and linguistic context, including work with English-language sources by non-native speakers.

Several factors appear to explain the effect. First, the **brevity and regularity** of verification warm-ups turned SIFT into a habit rather than a one-time lesson topic. Second, **authentic materials** — real advertisements, viral images and websites — created cognitive conflict: students were surprised when professionally designed sites turned out to be funded by interest groups. Third, the **reflective stage** required students to describe their verification process, which strengthened metacognitive control. This supports the view that critical online reasoning is not a set of isolated tricks but an integrative skill with motivational and reflective components.

The role of foreign language proficiency deserves special attention. The students who remained at the emerging level had, on average, lower reading fluency in English, and in their reflections they mentioned that searching and reading several English-language sources in a short time was stressful. This suggests that the linguistic load of verification should be deliberately managed: at the beginning, teachers can provide ready-made search phrases, glossaries of media vocabulary (*sponsored, funded by, fact-check, debunked, misleading*), and allow students to consult sources in their first language when checking the reputation of an organisation. As proficiency grows, these supports can be gradually removed. In this

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way, the formation of evaluation skills and the development of language competence reinforce each other instead of competing for the same limited lesson time.

The teacher's role also changes. Instead of being the main supplier of verified information, the teacher becomes a model and a coach of verification. The most effective technique observed in the study was the teacher's think-aloud demonstration of the SIFT moves, followed by comparison of students' routes with the expert route. This corresponds to the principle that people's competence against misinformation can be strengthened by teaching them simple, transferable cognitive tools (Kozyreva et al., 2020), and it implies that teacher training programmes should include practical workshops on lateral reading and online fact-checking.

The study has limitations: the absence of a control group does not allow the effect to be separated completely from students' general development during the semester, and the sample was drawn from one university. Further research should include a control group, delayed post-tests and the evaluation of AI-generated texts and images, which represent a rapidly growing type of internet content requiring new verification strategies.

5. CONCLUSION

Evaluating the reliability of internet information is an integrative skill consisting of motivational, cognitive, operational and reflective components. The proposed four-stage methodology, based on the SIFT method, lateral reading and the analysis of manipulation techniques, significantly improved students' performance on all tasks and changed their verification strategy from vertical to lateral reading. It is recommended to include regular verification practice in the curricula of foreign language and other university courses, to use performance-based assessment of the skill, and to prepare teachers to model expert strategies of online verification.

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