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Developing Students' Information and Research Competence in a Digital Learning Environment: A Three-Layer Verification Methodology for Uzbek Higher Education, with Applications in Anthropology and Cultural Studies

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Abstract

This article examines the theoretical foundations and practical methodology of forming students' information and research competence in a digital learning environment. The competence is defined as an integrated system of five components: identifying an information need, constructing a search strategy, critically appraising sources, synthesising evidence, and assuming academic and ethical responsibility. The empirical part rests on an eight-week quasi-experiment with 50 students of a higher education institution in the Tashkent region, in which the experimental group practised confirming or rejecting the answers of generative artificial intelligence (AI) systems by means of a "three-layer verification" algorithm combining lateral reading, a return to the primary source and a rule of independent confirmation. In the experimental group the mean score on the information verification test rose from 16.4 to 30.6 out of 40 points (d = 2.61), the rate of detecting fabricated sources and invented citations increased from 18 to 84 per cent, and the time spent verifying a single claim fell from 14.2 to 5.8 minutes; the gains were largely retained after six weeks. Because anthropological and cultural knowledge is situated, locally grounded and unevenly digitised, the article then shows how the algorithm can be specialised for anthropology and cultural studies, proposing discipline-specific verification tasks and adaptations of the independence rule. The article concludes with a proposal for the phased introduction of a stand-alone course, "Using Artificial Intelligence," in Uzbek higher education, together with its seven-module syllabus.

Keywords: information and research competence, digital learning environment, lateral reading, generative artificial intelligence, fabricated information, source criticism, anthropology education, cultural heritage, higher education, Uzbekistan

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Introduction

Digitalisation has changed the nature of the learner's central difficulty. If in the second half of the twentieth century the barrier was limited access to information, today the task is to extract, from a boundless stream of uneven quality, what is reliable and relevant to the learning task. This condition has been described through the concepts of information overload and the anxiety, avoidance of decisions and superficial satisfaction it produces (Bawden & Robinson, 2009, p. 181). Educational psychology has shown that the skill of solving information problems does not develop spontaneously: experienced and inexperienced users of the same search system apply different strategies at the stages of problem formulation, query construction and text evaluation (Brand-Gruwel et al., 2005, 2009). The notion of a "digital generation" is methodologically misleading: there is no automatic link between mastery of a device and the capacity for critical analysis.

The mass spread of generative systems has moved the problem to a new stage. Large language models present flawless, logically coherent text behind whose sentences there is not necessarily a verified source; the generation of fabricated content has been described as a systemic property of the technology (Ji et al., 2023). In education this is especially dangerous: the answer carries no signs of uncertainty, neither an admission of "I do not know" nor an indication of the weakness of a source. Large research groups place precisely this risk first: uncritical trust in a ready-made answer and a retreat from the exercise of independent thought (Kasneci et al., 2023). A meta-analysis shows that the influence of generative tools on learning outcomes is heterogeneous and depends on the way they are pedagogically embedded (Deng et al., 2025). The substantive question is therefore not whether to use these tools but how to teach their use together with a culture of verification.

For higher education in Uzbekistan the question is pressing: students' use of generative systems has become almost universal in the absence of methodological support and oversight. The response of universities is predominantly prohibitive, and the instruction "do not use artificial intelligence" substitutes for teaching the skill of verification. The international literature notes that academic integrity is discussed mainly in a logic of detection and prevention, whereas the educational route to its solution has been developed only weakly (Cotton et al., 2024; Lund & Wang, 2023).

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The problem has a particular edge in the social sciences, and in anthropology and cultural studies above all. Anthropological knowledge is situated, local and often non-textual: it rests on fieldwork, oral testimony and community-held practices, much of which is only partly digitised and circulates through secondary retellings (Geertz, 1973; Smith, 2012). A generative system trained predominantly on web text tends to smooth such knowledge into confident generalisations, and the over-representation of certain populations and viewpoints in research samples and training corpora is well documented (Atari et al., 2023; Bender et al., 2021; Henrich et al., 2010). For students of anthropology, ethnology and cultural heritage, therefore, verification is not merely a technical safeguard but part of the discipline's own epistemology: the question "who says this, from where, and on what evidence?" is the question every ethnographer is trained to ask of a source (Clifford & Marcus, 1986). The present article accordingly develops a general methodology and then shows how it can be specialised for anthropology and cultural studies, using examples from the Uzbek context.

The aim of the article is to propose a model for forming information and research competence in a digital environment, to set out an eight-week methodology built on it, to analyse the results of an experiment with 50 students, to show how the methodology can be specialised for anthropology and cultural studies, and to substantiate the introduction of a separate academic discipline. The object of the study is the process of independent search in a digital learning environment; the subject is the methodology for forming skills of critical selection and verification of information. The working hypothesis is that the regular testing of generative-system answers through a structured verification algorithm statistically significantly improves not only work with AI but also the evaluation of digital sources in general, since the algorithm is oriented not toward a tool but toward evidence. The scientific novelty lies in the fact that, to the author's knowledge, for the first time in the conditions of Uzbek higher education, and with attention to the features of the Uzbek-language information environment, an exercise in verifying an AI answer is used as the main pedagogical instrument for developing information literacy, and its effectiveness is substantiated with measurement instruments.

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Problem Statement and Literature Review

❖ Information problem solving and source evaluation

Kuhlthau's (1991) model of the information search process described searching as an emotional-cognitive experience passing through stages of uncertainty, anxiety and clarification. Dutch researchers decomposed the skill of solving information problems into the sub-skills of defining the problem, searching, scanning, in-depth reading, organising and presenting information, and found that the difference between experienced and inexperienced users shows itself at the stages of evaluation and organisation (Brand-Gruwel et al., 2005). The line of work was supplemented by a descriptive model for working on the internet (Brand-Gruwel et al., 2009), after which source evaluation emerged as an independent direction (Brand-Gruwel & Stadtler, 2011). A methodological conclusion follows: information skill should be regarded not as an indivisible "ability" but as a set of operations that can be trained and measured separately.

The second direction studies the mechanisms of credibility assessment. Metzger and Flanagin (2013) showed that in online environments the reliability of a source is judged not through systematic analysis but through cognitive heuristics: the appearance of a site, a familiar name, or position in the search results. Sundin et al. (2017) observe that the act of "searching" has turned into a reflex that remains outside critical control. It follows that a student errs not because he or she fails to evaluate the source but because the evaluation is too fast. A solution was proposed by Wineburg and McGrew (2019): comparing the practice of fact-checkers, historians and students, they established that what distinguishes the specialists is not deeper reading of the text but leaving it. The fact-checker opens new tabs and looks at what others say about the source, reaching a conclusion in less time.

❖ Lateral reading and resistance to misinformation

The effectiveness of lateral reading has been tested in a series of controlled studies. A large-scale assessment of students' ability to evaluate online sources showed an extremely low baseline level (McGrew et al., 2018); an intervention study demonstrated gains even from brief instruction (McGrew et al., 2019); an experiment in a civic online reasoning course confirmed the effect of systematically integrated practice (McGrew, 2020); a district-wide field study reproduced the results on a broad school sample (Wineburg et al., 2022); and fact-checking lessons in a general education course changed the strategies of college students (Brodsky et al., 2021). In

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parallel, research on resistance to unreliable information developed: a digital media literacy intervention improved discernment between true and false news in two countries (Guess et al., 2020); a game-based "inoculation" approach strengthened psychological resistance (Roozenbeek & van der Linden, 2019); and Pennycook and Rand (2019) argued that the main reason for believing a false report is not ideological partisanship but a failure to engage analytical thinking. The last conclusion is central to the present methodology: the target of the intervention is not the student's convictions but the speed and habit of his or her thinking.

❖ **Artificial intelligence in education and AI literacy**

The third direction concerns the place of AI in education. The systematic review by Zawacki-Richter et al. (2019) notes that publications are addressed mainly to technological solutions while the voice of educators themselves is hardly heard. Kasneci et al. (2023) stressed that critical thinking is a precondition for the use of the technology. Cotton et al. (2024) argued that for universities transparent policy, training and support are more effective than prohibition, and Lund and Wang (2023) listed the consequences for higher education and libraries. A review conceptualising AI literacy identified four aspects of it: knowing and understanding, using and applying, evaluating and creating, and ethical issues (Ng et al., 2021). A validated questionnaire for measuring the construct was developed later (Ng et al., 2024), and a framework of AI literacy competencies and design considerations for learning interventions has been proposed (Long & Magerko, 2020).

❖ **Anthropological perspectives on evidence and digital mediation**

Anthropology and cultural studies add a distinct and complementary tradition to this literature. The methodological core of anthropology is the critical reading of authority. Clifford and Marcus (1986) showed that the ethnographer's claim to speak for a culture is itself a textual and rhetorical construction that has to be examined, and Geertz (1973) argued that cultural description is interpretive and must be "thick" enough to recover the meanings that people attach to their own practices. Decolonising approaches add the question of who produces knowledge about whom, and for whom (Smith, 2012). The history of the region offers a pointed reminder: Hirsch (2005) demonstrated how ethnographic expertise was used in the early Soviet period to define and classify national categories, so that categories now encountered in sources, and reproduced by AI systems as neutral facts, may have a political history. Digital anthropology and digital ethnography have meanwhile examined how online environments reshape evidence, relationships and fieldwork

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itself (Horst & Miller, 2012; Pink et al., 2016), but they have given little attention to the pedagogy of verifying AI-generated claims.

Two further strands are relevant. First, language models draw on corpora that, as Bender et al. (2021) argue, over-represent hegemonic viewpoints, and the responses of one widely used model have been found to resemble those of people from Western, educated, industrialised, rich and democratic societies more closely than those of other populations (Atari et al., 2023). Second, Messeri and Crockett (2024) warn that AI tools in science may produce "illusions of understanding," in which researchers believe that they understand more than they actually do. Taken together, these strands suggest that, for anthropology students, the verification of AI output is not a technical add-on but an extension of the discipline's own habit of questioning evidence.

❖ **Research gaps**

The review reveals three gaps. First, experimental work on lateral reading is directed at web pages, objects with an author and an address; the answer of a generative system lacks an address, an author and a date, yet produces a stronger impression of reliability, and this difference has not been considered methodologically. Second, work on AI literacy remains conceptual: it says what to teach but does not describe the organisation of a lesson, the composition of tasks or the method of assessment. Third, almost all studies have been conducted in an English-language environment with a developed fact-checking infrastructure, whereas the Uzbek-language environment is different: part of the primary sources is not digitised, terminological variability is high, a considerable volume of information circulates through secondary translation, and the error rate of generative systems can be expected to be higher for queries in Uzbek, a lower-resource language.

A fourth, disciplinary gap follows from the preceding discussion: the author is not aware of studies that specialise a verification algorithm for anthropology and cultural studies, where claims concern situated, locally held and often non-textual knowledge. The article addresses these gaps together: it takes the generative answer as the object of verification, turns verification into a stepwise algorithm for the lesson, tests it in the Uzbek-language environment, and shows how the algorithm can be adapted to anthropological and cultural material.

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Theoretical and Methodological Foundations of the Study

By information and research competence is meant the student's ability to formulate an information need precisely, to build an appropriate search strategy, to verify independently the origin and reliability of the information found, to synthesise data from different sources while indicating contradictions, and to accept academic and ethical responsibility for his or her own conclusion. The definition includes five separately measurable components: formulation of the need, search strategy, source criticism, synthesis and ethical responsibility. The structure is consistent with models of information problem solving (Brand-Gruwel et al., 2005, 2009) but differs from them in two respects. Source criticism is singled out as the central component, since in a generative environment this stage becomes the weakest link. The component of ethical responsibility is added: the student must not only find reliable information but also show transparently how artificial intelligence was used, since academic integrity should be posed as an educational rather than a technical question (Cotton et al., 2024).

The core of the methodology is the principle of "three-layer verification." The first layer is lateral reading: instead of evaluating the text from within, the student immediately goes out to external sources and searches for the claim itself independently. The principle is borrowed from the practice of fact-checkers (Wineburg & McGrew, 2019), and its effectiveness in educational settings has been confirmed repeatedly (McGrew et al., 2019; McGrew, 2020; Wineburg et al., 2022). The second layer is the return to the primary source: if the claim rests on a document, law, statistic or scientific study, the student turns to the original and checks the figure, date and wording verbatim. The third layer is the rule of independence: a claim must be confirmed by at least two mutually unconnected sources, and aggregator sites that reproduce one another count as one. The sequence of layers deliberately slows rapid heuristic evaluation (Metzger & Flanagin, 2013) and engages the analytical mode of thinking recognised as the main mechanism of resistance to unreliable information (Pennycook & Rand, 2019).

The role of AI is defined strictly: a generative system is regarded not as a source but as a generator of hypotheses, and its answer is a list of assumptions to be verified. The position follows from the nature of the technology, since the production of fabricated content has been described as a feature of the generation mechanism itself and not a temporary defect (Ji et al., 2023). The student is given neither the

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instruction “do not use” nor the instruction “trust”; the procedure “check every significant claim and show the trace of verification” is practised. Such a position corresponds to the evaluative and ethical aspects of AI literacy (Ng et al., 2021, 2024) and does not tie the skill to a particular tool.

Organisational Model of the Experimental Work

The work was conducted with second- and third-year students of a higher education institution in the Tashkent region over eight weeks. The sample comprised 50 students, divided by random assignment into an experimental group (n = 25) and a control group (n = 25); the design was quasi-experimental, with pre- and post-measurement. The control group performed ordinary assignments for independent work; the use of AI was not forbidden to it, but it was not taught a special verification algorithm. The experimental group studied two hours per week in class and completed up to three hours of independent tasks weekly, which amounted to 16 classroom and 24 independent hours. The groups were balanced by gender, year of study, field of study and baseline academic indicators (mean age 19.8 and 19.9 years; share of daily users of generative systems 88 and 84 per cent). Participants gave consent to the anonymous processing of the data.

The programme consists of six modules arranged from simple to complex: (1) formulation of the information need, that is, turning a broad topic into a verifiable claim; (2) construction and reformulation of the query, including a task design that requires sources to be indicated; (3) lateral reading as the central part of the programme; (4) work with the primary source, namely normative documents, official statistics, scientific publications and their identifiers, checking a quotation against the original, and checking the date and edition number; (5) synthesis of contradictory information; and (6) academic ethics and transparency, with completion of a “usage protocol.” All sessions had the same structure, and this repetition was chosen deliberately for the sake of automating the skill. A session began with a precise question from the instructor; students presented it to a generative system and recorded the answer without changes, divided it into separate claims, applied the three-layer verification and assigned each claim to one of the categories “confirmed,” “partly confirmed,” “refuted” or “could not be verified.” The session ended with a group discussion analysing the typology of errors. Over eight weeks the cycle covered 240 generative answers. The assignments were tied to the

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Uzbek-language local context, since the highest frequency of errors was expected there.

Assessment Criteria and Measurement Instruments

Three measurement instruments were used. The first is the information verification test, provisionally named AITB-20, which consists of twenty items with a maximum of 40 points; some items are aimed at detecting a fictitious source, some at confirming a statistical claim, and the rest at checking quotations and dates (Cronbach's $\alpha = .84$). The second is an analytic rubric of five criteria with four levels for assessing the trace of verification in written work: identification of claims, lateral reading, recourse to the primary source, two independent sources, and transparency and ethics; the works were assessed by two independent experts (Cohen's $\kappa = .81$). The third consists of process data: the time taken to verify one claim, the number and type of sources used, and the distribution across verification categories. Student's t-test for independent samples was applied, the effect size was calculated through Cohen's d, and the significance level was set at $p < .05$.

Results of the Experimental Work

The pre-test showed the same baseline level in the two groups: 16.4 points out of 40 (SD = 3.8) in the experimental group and 16.9 (SD = 4.1) in the control group, a statistically insignificant difference ($t = 0.44$, $p = .66$). The result is significant in itself: almost all students in the sample, despite daily use of generative systems, did not possess a systematic skill of verifying their answers. The repeat measurement showed growth of the experimental group's mean to 30.6 points (SD = 4.2), whereas in the control group it rose only to 19.1 (SD = 4.6); the between-group difference is highly significant ($t = 9.21$, $p < .001$) and the effect size is very large ($d = 2.61$). The gain in the control group is explained by the repeated presentation of the test and by general learning progress over the semester (see Table 1).

Table 1: Results of Pre-Test and Post-Test Measurement (AITB-20, Maximum 40 Points)

Group	Pre-test	Post-test	Gain	Statistical indicator
Experimental (n = 25)	16.4 (*SD* 3.8)	30.6 (*SD* 4.2)	+14.2	t = 9.21; p < .001; d = 2.61

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Control (n = 25)	16.9 (*SD* 4.1)	19.1 (*SD* 4.6)	+2.2	t = 1.78; p = .08
Experimental, after 6 weeks	—	28.9 (*SD* 4.5)	−1.7	high retention

Note. For the experimental row, t, p and d refer to the between-group comparison at post-test. The statistic in the control row is reported as it appears in the source data and is understood to refer to the pre–post change in the control group.

A more informative picture is given by the distribution across individual skills. Detection of a non-existent source or fabricated citation rose from 18 to 84 per cent and became the most productive direction: checking the existence of a source is the most definite and most easily reproducible operation. Query reformulation (from 10 to 68 per cent) and posing a counter-question, that is, forcing the system to justify its conclusion (from 8 to 70 per cent), grew more slowly: these skills require not only procedure but also subject-matter preparation (see Table 2).

Table 2: Dynamics of Indicators by Individual Skill (per cent)

Skill	Exp.: start	Exp.: end	Control: start	Control: end
Application of lateral reading	12	76	16	24
Detection of a fictitious source or citation	18	84	20	28
Recourse to the primary source	24	72	22	30
Checking statistics against an official source	22	80	24	32
Query reformulation	10	68	12	18
Posing a counter-question	8	70	10	16
Completion of the usage protocol	0	92	0	4

Note. Exp. = experimental group.

The process data showed development of the skill in terms of speed as well. In the first sessions students spent on average 14.2 minutes verifying one claim; by the eighth week the time had fallen to 5.8 minutes, while the number of independent sources rose from 1.3 to 2.6. The simultaneity of these changes is important: speed grew not at the expense of quality but through the efficiency of the strategy, which is consistent with observations of the practice of fact-checkers (Wineburg & McGrew, 2019). In the 240 verified answers, students recorded 96 unreliable or

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unconfirmed claims, an average of 0.4 errors per answer; their typology is given in Table 3.

Table 3: Indicators of the Verification Process and Typology of Detected Errors

Indicator	Week 1	Week 8
Time to verify one claim	14.2 minutes	5.8 minutes
Number of independent sources used	1.3	2.6
Share of the category "could not be verified"	34%	9%
Detected errors: non-existent source	—	31
Detected errors: incorrect figure or date	—	26
Detected errors: misattributed quotation	—	17
Detected errors: outdated norm	—	14
Detected errors: confused local fact	—	8

Note. The detected errors total 96 across 240 answers (0.4 per answer).

The six-week follow-up confirmed the stability of the skill: the experimental group's mean was 28.9 points, a decline of only 1.7 points from the post-test. The qualitative data point in the same direction: 88 per cent of students noted a change in their attitude to the answer of artificial intelligence, and 76 per cent said that they now feel uncomfortable using it without verification, which reflects a transition from heuristic to analytical evaluation (Metzger & Flanagin, 2013; Pennycook & Rand, 2019).

Practical Examples from the Sessions

❖ Five typical cases

The sessions revealed five typical cases. The first is a non-existent scientific source. Asked to list five foreign studies, the system produced five references in full bibliographic form, yet two identifiers led to no publication and in a third reference the volume number did not correspond to the year of publication; three of the five references proved wholly or partly fabricated. The lesson of the case is that the full and official appearance of a reference does not prove its existence (Ji et al., 2023). The second concerns normative information: the system correctly set out the content of an article of a law but gave its number incorrectly and presented an outdated edition as current. The case was analysed under the title "reliable content,

unreliable address," since the most dangerous type of error is not the wholly fabricated but the partly correct answer: a wholly incorrect answer arouses suspicion, whereas a partly correct one stops the checking.

The third case is statistics: the percentages given matched the official source neither in value nor in reporting period, which students called the "trust-in-numbers effect." The fourth is a quotation attributed to the wrong author: a search for the phrase in quotation marks found it only on quotation-collection sites, and a search within the text of the indicated work confirmed its absence. The fifth relates to language: to the same question in Uzbek and in English the system returned different answers, with terms translated inaccurately and the local context generalised in the Uzbek-language version. Hence the rule of comparing the answer in two languages and verifying it against an Uzbek-language primary source. Taken together, the five cases show the main pedagogical effect of the methodology: the student changes not because he or she has found an error but because he or she has learned that finding it is possible.

❖ Specialisation for anthropology and cultural studies

The five cases above come from a general student sample and were not tied to a single discipline. Anthropology and cultural studies, however, present verification problems of their own, and the methodology can be specialised for them without changing its three-layer structure. The tasks described in this section are proposed designs for the sectoral variant of the course discussed in Section 9; they were not part of the eight-week experiment, and no empirical results are claimed for them. Table 4 sets out six task types, each paired with what students verify and the disciplinary point it raises.

Table 4: Illustrative Verification Tasks for Anthropology and Cultural Studies (Proposed Designs, Not Experimental Data)

Task type	Illustrative prompt to the AI system	What students verify (layer)	Disciplinary point
Non-existent ethnographic source	"List five ethnographic monographs on kinship or community life in Central Asia."	Existence of each title, author, publisher and year in library catalogues and on publisher pages (layers 1–2)	A convincing bibliographic form is not evidence of fieldwork; ethnographic authority rests on traceable work (Clifford & Marcus, 1986).
Misattributed quotation	"Give Geertz's definition of culture, with its source."	Phrase search, then location of the passage in the original	Quotations circulate in secondary collections,

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		text (Geertz, 1973) (layers 1–2)	detached from the argument in which they were made.
Heritage and register facts	"When and under which category was this Uzbek cultural element inscribed by UNESCO?"	Dates, categories and submitting states against the official register (layer 2)	Safeguarding of intangible heritage is defined by the 2003 Convention (UNESCO, 2003); registers, not summaries, are the primary source.
Over-generalisation	"Describe how weddings are organised in Uzbekistan."	Comparison with at least two independent ethnographic or sociological sources from different regions or periods (layer 3)	Practice varies by region, generation and social setting; one confident description flattens variation (Geertz, 1973; Henrich et al., 2010).
Inherited classifications	"Which ethnic groups live in Central Asia, and how are they classified?"	Date, author and institutional context of each classification (layers 1–2)	Ethnographic categories have political histories (Hirsch, 2005).
Language and terminology	"Explain the institution of the mahalla in Uzbek, Russian and English."	Cross-checking of glosses against Uzbek-language scholarship and community-based sources (layers 2–3)	Terms are translated unevenly, and vernacular concepts resist single-word equivalents (Smith, 2012).

Note. The prompts are templates; instructors substitute the heritage element, region or concept being studied.

Three features distinguish these tasks from the general ones. First, in several tasks the "primary source" is not a document but a body of practice: a repertoire of epic performance, a craft tradition or a ritual cycle is held by communities of practitioners, and written descriptions are secondary. For such cases the second layer is redefined as a return to the most direct record available, such as a published field recording, a community-endorsed archive, or the testimony of practitioners obtained with their consent, and students are asked to state explicitly what kind of authority each source has. Recent anthropological work on epic storytelling and bakhshi traditions in the Qashqadaryo oasis (Yarmatov, 2026) is an example of the locally grounded scholarship with which an AI answer on such a topic can be compared.

Second, the ethics component acquires a disciplinary dimension. Anthropological research depends on the trust of the people studied, and professional principles require their protection (American Anthropological Association, 2012). The usage protocol of Module 6 is therefore extended for these students with a data-protection rule: field notes, interview transcripts and images of identifiable people must not be entered into public generative systems without anonymisation and the consent of the people concerned. Third, the independence rule needs adaptation. In the general version two unconnected sources suffice. In anthropology, two sources may

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legitimately disagree because they describe different places, periods or social positions, and agreement may reflect nothing more than shared dependence on a single early ethnography. Students therefore record, for each claim, the field site, period and positionality of each source, and explain whether a disagreement reflects error or variation.

Discussion of the Results

The results are consistent with the conclusions of the international literature and extend them to new conditions. That teaching lateral reading raises the level of source evaluation has been shown in controlled studies (McGrew et al., 2019; McGrew, 2020; Wineburg et al., 2022), yet in them the object of verification was the web page. Our experiment shows that the same technique, applied to the answer of a generative system, not only retains its effectiveness but may, in the size of the effect, prove higher, although effect sizes from different studies are not directly comparable. There are two explanations. The motivational one: when students see with their own eyes the error of a tool they use every day, the impression is stronger than that from an abstract exercise. The structural one: in a generative answer the claims are densely packed and lack sources, so the necessity of verification is obvious, whereas on a web page the presence of links creates the illusion that verification has already been performed.

The results indirectly support the conclusion that the main mechanism of resistance to unreliable information is not combating partisanship but activating analytical thinking (Pennycook & Rand, 2019). The greatest change occurred not in the volume of knowledge but in the speed of reaction to an answer: instead of immediate acceptance, students acquired the habit of stopping, breaking the answer into parts and checking. The skill therefore proved not to be tied to the tool, and it was retained after six weeks. Retention matters because it is often unclear whether the gains from brief literacy interventions endure; the high retention observed here may be explained by the construction of the programme as a repeating cycle, although a six-week follow-up is short. At the same time, the results should not be absolutised: the indicators that grew most slowly depend on subject-matter preparation and develop together with deepened knowledge of the subject. Academic integrity deserves separate attention: completion of the usage protocol rose from zero to 92 per cent, which speaks to the relative ease of forming a habit of transparency when it is presented not as a punitive measure but as an understandable procedure. The

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observation is consistent with the recommendation that for universities policy, training and support are more effective than prohibition (Cotton et al., 2024). Finally, the study shows a way of turning the construct of AI literacy (Ng et al., 2021, 2024) into practical teaching, which answers the criticism of the weak link between this literature and pedagogical theory (Zawacki-Richter et al., 2019).

For anthropology and cultural studies, the findings carry three implications. First, the types of error that students detected (non-existent sources, incorrect figures or dates, misattributed quotations, outdated norms and confused local facts) have direct disciplinary counterparts: invented ethnographies, garbled dates of fieldwork, misquoted theorists, outdated classifications and conflated local practices. The generic algorithm therefore transfers readily at the level of procedure. Second, the transfer is not mechanical at the level of epistemology. In legal or technical fields, the "primary source" is usually a document or dataset with a stable identifier; in anthropology it may be a performance, a practice or a community's own account, and "independent confirmation" may be undermined by the dependence of later authors on a few early ethnographies. This is why Section 7.2 redefines the second and third layers rather than discarding them. Third, the discipline's own self-critique supplies a ready vocabulary for the habit the methodology seeks to build: the ethnographer's question of who speaks, from where and with what authority (Clifford & Marcus, 1986) is, in effect, the question of lateral reading asked of a source and of oneself. Pedagogically this means that anthropology instructors need not import an alien technique; they can present the verification of AI output as a continuation of disciplinary training. These implications concern design rather than data: the anthropology-specific tasks remain to be tested empirically.

Proposal for Introducing the Academic Discipline "Using Artificial Intelligence"

The theoretical analysis and the results of the experiment lead to a single conclusion: the skill of working with AI requires a separate academic discipline. First, it is not formed in a natural way: the control group, using the same tools daily, gained 2.2 points in eight weeks, while the experimental group gained 14.2. Second, the formation of the skill depends on time: the most effective result was given by a cycle repeated for eight weeks, which does not fit into the format of a two- or three-hour topic within an existing course. Third, the composition of the competence is interdisciplinary: it combines elements of information science, logic, academic

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writing, law and ethics. In the international literature AI literacy is likewise described as an independent construct whose four aspects should be taught separately (Long & Magerko, 2020; Ng et al., 2021), and special instruments have been developed for its measurement (Ng et al., 2024).

It is advisable to place the discipline in the general professional module for all fields of study, in the first semester of the second year. The volume is 2 credits, that is, 60 hours: 30 classroom and 30 independents. The course is directed not at studying the internal structure of the technology but at forming an intellectual and ethical culture of its use; it is not a programming course but a course of working with information. At least two thirds of classroom sessions should be practical. Assessment consists of three parts: ongoing control through weekly verification protocols, an intermediate critical-analysis assignment, and a final short research paper on a topic in the student's specialty. The main criterion of the final paper should be not the volume of text but the completeness of the verification trace (see Table 5).

Table 5: Proposed Modular Programme of the Discipline "Using Artificial Intelligence" (60 Hours)

No.	Module title	Class	Indep.	Expected outcome
1	Artificial intelligence: capabilities and limitations	4	4	Explains the nature of the technology and the cause of fabricated content
2	Information need and query construction	4	4	Turns a topic into a verifiable claim
3	Lateral reading and source criticism	6	6	Verifies a claim through independent sources
4	Work with the primary source	6	6	Confirms a document, statistic or publication against the original
5	Synthesis of contradictory information	4	4	Forms a reasoned conclusion when sources conflict
6	Academic integrity and transparency	4	4	Correctly completes the usage protocol
7	Final project and its defence	2	2	Presents a fully verified short paper
	Total	30	30	60 hours / 2 credits

Note. Class = classroom hours; Indep. = independent hours.

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The introduction of the discipline is advisable in stages. The first stage is pilot teaching in a limited number of universities during an academic year, with assessment of results by a single instrument. The second is the training of the teaching staff, since the success of the discipline depends directly on whether the instructor has mastered the practice of verification. The third is inclusion in the general professional module for all fields, with simultaneous introduction into the internal academic integrity policy of a procedure for disclosing the use of AI. The fourth is sectoral specialisation, in which for the fields of law, medicine, engineering, pedagogy, journalism, and anthropology and cultural studies the exercises are reworked on the basis of the source's characteristic of those fields. For anthropology and cultural studies, specialisation would adjust Modules 3, 4 and 6 in the ways outlined in Section 7.2: lateral reading is practised on ethnographic and heritage sources; the primary-source module includes registers such as the UNESCO lists of intangible cultural heritage, archival and field recordings, and the original texts of theoretical works; and the usage protocol includes the data-protection rule for informants' material.

The proposal is not limited to Uzbekistan, since the problem itself is not bound by national borders. The property of generative systems to produce fabricated content operates irrespective of language and country (Ji et al., 2023), and the habit of evaluating a source by superficial signs has been recorded repeatedly in the literature (McGrew et al., 2018; Metzger & Flanagin, 2013). At the same time, for educational systems working in languages other than English the problem is sharper: the digital infrastructure needed for verification, namely open archives, fact-checking services and machine-readable official data, is less developed in these languages, and the error rate of generative systems can be expected to be correspondingly higher. The proposed model differs from existing open courses in one respect: it is based not on familiarisation with the technology but on a verification exercise. It is not a course on studying AI but a course that teaches how to find the truth with its help.

Limitations of the Study

Several limitations should be considered when interpreting the results. The sample is small (50 persons) and confined to one university, so the extension of the results to the national scale requires a repeated multi-university study. Because the experimental group took part in additional sessions, the result may partly include

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the effect of the instructor's attention; to exclude it, it would be advisable to offer the control group sessions of equal volume but different content. The test used is the author's own development and has not undergone large-scale validation, and the measurement of retention is limited to six weeks. Generative systems are updated rapidly, so the figures of the error typology should be considered time-bound, whereas the verification algorithm should be regarded as independent of the tool. Finally, the anthropology-oriented tasks proposed in Section 7.2 have not yet been tested empirically, and the sectoral variant of the course needs piloting with students of anthropology, ethnology and cultural studies before conclusions about its effectiveness can be drawn.

Conclusion

The study showed that students' information and research competence in a digital learning environment is formed not in a natural way but through a specially organised, repeated and measurable pedagogical practice. The proposed five-component model and its core, the three-layer verification algorithm, were tested in eight weeks of work with 50 students and showed high effectiveness: the mean score on the information verification test rose from 16.4 to 30.6 points, the rate of detecting fabricated sources and invented citations rose from 18 to 84 per cent, the time of verifying one claim fell from 14.2 to 5.8 minutes, and the number of independent sources more than doubled. In the control group no statistically significant change was noted, which confirms the hypothesis and shows that the experience of everyday use does not in itself give the skill of critical verification.

The most important methodological conclusion is that the answer of generative AI can serve as the most convenient and effective teaching material for information literacy: it offers an unlimited opportunity to practise critical analysis and forms a skill applicable to any digital source. The attitude to AI in higher education should therefore move from a logic of prohibition and detection to a logic of teaching and transparency. The organisational form of this transition is proposed to be a stand-alone academic discipline, "Using Artificial Intelligence," of 2 credits and seven modules, with a predominance of practical sessions and phased introduction. For anthropology and cultural studies, whose knowledge is situated, locally held and unevenly digitised, the same algorithm can be specialised through source-sensitive adaptations of the independence rule, verification tasks built on heritage registers and archival records, and the protection of informants' data; testing these

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adaptations is the next step. The proposal has practical significance both for higher education in Uzbekistan and for the educational systems of other countries with similar linguistic and infrastructural conditions.

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