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DEVELOPING THE INFORMATION-ANALYTICAL CULTURE OF STUDENTS: A DIGITAL-PEDAGOGICAL METHODOLOGY

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Abstract. This article substantiates a methodology for developing the information-analytical culture of students on the basis of a digital-pedagogical approach. The study proceeds from three changes that have inverted the conditions under which the concept was originally formulated: the abundance inversion, by which the governing problem has shifted from finding information to rejecting it; the collapse of fluency as a credibility signal, since the surface markers by which students were taught to judge a text — coherence, confident tone, apparent citation — have become costless to produce; and the verification asymmetry, which makes the injunction to check everything unrealisable and converts the real competence into the allocation of a limited verification budget. The author substantiates a five-component structure of information-analytical culture, distinguishes three roles of the digital in the approach — medium, object and environment — and elaborates a four-stage methodology whose central transition is from vertical to lateral reading. The polemic between d. boyd and S. Wineburg concerning whether media literacy instruction has backfired is subjected to critical examination.

Keywords: information-analytical culture, digital-pedagogical approach, information literacy, lateral reading, source evaluation, attention economy, verification budget, triage of information, generative models, digital native fallacy, higher education.

INTRODUCTION

The formation of an information-analytical culture is named among the aims of higher education in virtually every contemporary standard, and the term is employed as though its content were settled. It is not. The concept was elaborated under conditions since reversed in three respects, and a methodology that does not register these reversals trains capacities the present situation no longer requires while leaving untrained those it has made decisive. The first reversal concerns the governing scarcity. The conception was formed when information was difficult to obtain: the library was finite, the journal arrived late, the problem was finding what existed, and the skills emphasised were accordingly those of search and retrieval. The constraint has since moved to the opposite pole. H. Simon put the matter precisely in observing that a wealth of information creates a poverty of attention, so that the problem becomes the efficient allocation of attention among the sources competing for it. A student skilled at collecting material and unpractised in rejecting it is not well prepared but disabled, since his competence multiplies the quantity he cannot process. The second reversal concerns the signals by which credibility is judged. Students have been taught to assess a text by its surface properties: coherent organisation, freedom from error, a confident impersonal register, the presence of references. These were serviceable proxies for one reason only: producing such a text was expensive, and the expense was borne by someone with a reputation to protect. Generative models have removed that expense, and fluent prose with plausible citations is now produced in seconds by a system with no knowledge of whether its assertions are true. The inherited heuristics have therefore not merely weakened but inverted, since the features that once indicated care now indicate nothing and may

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appear most abundantly where care is absent. The third reversal concerns the economics of checking. It has always cost more to refute a claim than to assert one, but the ratio has widened until the standard instruction to verify one's sources has become unrealisable: a student verifying every assertion he met in a day would complete no other work. The competence required is therefore not verification but triage — allocating a limited verification budget to the claims on which something turns and accepting unverified status for the rest. This is judgement rather than technique, and it is almost never taught. These considerations determine what a digital-pedagogical approach must mean if the term is to carry weight. It cannot mean using digital means to deliver instruction, since that leaves the content untouched. In the conception advanced here the digital occupies three positions at once: medium, through which work is organised; object, upon which analytical operations are performed; and environment, whose algorithmic selection, infinite supply and absent provenance constitute the conditions making the culture necessary. An approach employing the first alone is a delivery arrangement, not a pedagogical one. A persistent assumption obstructs the recognition of this. Students who have used digital devices since childhood are supposed to need little instruction in handling information, their operational fluency being evident. The supposition does not survive examination: speed in navigating an interface is unrelated to the capacity to establish who produced a claim and why. Operational fluency and analytical competence are distinct acquisitions, and the first conceals the absence of the second from students and teachers alike. For Uzbekistan these questions arise within a period of rapid change. The Digital Uzbekistan 2030 strategy, the expansion of network access and the digitalisation of higher education have placed students in an information environment of a density unknown to the system that prepared their teachers, while instruction in working with information remains concentrated in introductory informatics courses addressed to operation rather than judgement. The scholarly problem arises accordingly from the contradiction between the declared aim of forming an information-analytical culture and a methodology still addressed to scarcity, in which retrieval is trained, surface credibility signals are taught as reliable and the allocation of verification effort is not treated at all. The aim of the article is to substantiate a methodology for developing the information-analytical culture of students on the basis of a digital-pedagogical approach. The tasks were to establish the structure of this culture under present conditions; to determine the positions occupied by the digital; to elaborate the procedural organisation of the methodology; and to establish its criteria and levels. The novelty consists in substantiating the three reversals as the conditions governing the problem; in a five-component structure incorporating triage in its own right; in distinguishing the digital as medium, object and environment; and in a four-stage methodology whose central transition is from vertical to lateral reading.

LITERATURE REVIEW

Within Uzbek scholarship the foundation of the present study is supplied by the work of U.Sh. Begimqulov on the organisation and management of the informatisation of pedagogical education. His principal contribution lies in treating informatisation as a systemic transformation of the aims, content and methods of education rather than the addition of equipment to an unchanged process, and in his conception of the information-educational environment as a space within which the learner acquires not only subject knowledge but the capacity to work with information as such. This supports the third position assigned to the digital below, that of environment, and establishes that its properties are themselves an object of pedagogical design. The second pillar of the theoretical framework is provided by the research of A.A. Abduqodirov on the theory and practice of technology-mediated instruction.

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The author shows that technology does not by itself alter the quality of learning, which depends upon the didactic principles organising the mediated process, and insists upon preserving the active cognitive position of the learner where the mediating technology performs an increasing share of the work. This anticipates, for an earlier generation of tools, the problem generative systems have made acute, and grounds the requirement that analytical operations be retained by the student rather than delegated. The value and institutional dimensions of the question are illuminated by contemporary research: S. Ergashbaev demonstrates that stable orientations are formed through sustained processes of continuous education rather than isolated influences and, in a further study, singles out independent critical reflection as a central educational outcome, while M.M. Mirzaolimjon og‘li and E. Shohbozbek disclose the institutional context of the reform of higher education. Several international traditions bear upon the problem. H. Simon established the conception of the attention economy, from which the abundance inversion follows directly. C. Kuhlthau demonstrated that the information search process has an affective dimension, uncertainty predominating at the early stages, so that a methodology addressing only cognitive operations fails where students most often abandon the task. The Framework for Information Literacy of the ACRL reformulated the field around the proposition that authority is constructed and contextual rather than inherent in a source type. S. Wineburg and S. McGrew established, by comparing professional fact-checkers with students and academics, that competent evaluation proceeds laterally — leaving the page to discover who stands behind it — whereas the untrained read vertically, examining the page itself; M. Caulfield elaborated this into a teachable procedure, while d. boyd argued that media literacy instruction has in certain respects backfired. The gap addressed here is the absence of a methodology constructed for abundance rather than scarcity.

RESEARCH METHODOLOGY

The methodological foundation is constituted by the systemic approach, which made it possible to treat information-analytical culture not as an aggregate of skills but as an integral formation whose components condition one another, so that retrieval without triage produces overload rather than competence; within this framework the activity approach performed the leading function, since analytical operations are formed only in their performance upon real material, and the competence approach supplied the formulation of results in terms of demonstrable operations. The theoretical analysis of pedagogical, psychological and information-science literature reconstructed the conceptions of information culture, information literacy and source evaluation, while the comparative-historical method established how the conditions presupposed by the classical conception have changed and identified the three reversals upon which the study rests. Content analysis of curricula, syllabi of informatics and research-methods courses and the task apparatus of textbooks determined the proportion of assignments addressed to retrieval, to evaluation and to the allocation of verification effort. Protocol analysis, in which students thought aloud while evaluating a prepared set of sources, established the heuristics they actually apply and the incidence of vertical as against lateral reading, while the comparison of prepared materials, including texts generated by language models and texts of established provenance, tested the reliability of surface credibility signals. Questioning of students and teachers established their conceptions of the task. Pedagogical modelling yielded the five-component structure, the three positions of the digital and the staged organisation of the methodology, and pedagogical design elaborated the corresponding task systems, while expert assessment verified the proposed criteria. Elements of the pedagogical experiment, organised in ascertaining, formative and

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control stages with comparable groups, served to verify the methodology, and methods of mathematical statistics established the significance of observed differences. General scientific procedures of analysis and synthesis, induction and deduction, abstraction, generalisation and modelling were applied at every stage and secured the coherence of the conclusions.

RESULTS

The study established a five-component structure adapted to conditions of abundance. The need-formulating component comprises the conversion of a vague task into an answerable question, since an imprecise question cannot be satisfied by any quantity of material. The search-and-triage component comprises not only the location of sources but their deliberate rejection, recorded with its grounds, which converts rejection from an invisible act into an examinable one. The critical-evaluative component comprises the establishment of provenance — who produced the claim, on what basis and with what interest — exercised by leaving the document rather than scrutinising it. The analytic-synthetic component comprises comparison across sources, the detection of contradiction, the distinction of claim from evidence and the construction of a supported conclusion. The value-ethical component comprises accurate attribution, honest declaration of assistance from generative systems, and refusal to transmit what one has not checked. A second result distinguishes three positions occupied by the digital: medium, through which work is organised and recorded; object, in that digital artefacts — a search result page, an algorithmic recommendation, a generated text — are themselves submitted to analysis; and environment, whose infinite supply, algorithmic selection and absent provenance constitute the conditions making the culture necessary. A third result is the triage principle and the verification budget: since exhaustive checking is unattainable, the student identifies in advance the claims upon which his conclusion depends, expends verification effort upon those, and marks the remainder as unverified, so that uncertainty is declared rather than concealed. From these follows the four-stage organisation of the methodology. At the first stage the task is converted into an answerable question with stated criteria of sufficiency; at the second a bounded search is conducted under an explicit limit, accompanied by a rejection log; at the third the surviving sources are verified laterally, the student leaving each document to establish its provenance before assessing its content; at the fourth a synthesis is produced in which claims are distinguished from evidence, contradictions are named rather than smoothed and residual uncertainty is declared. Three levels were distinguished: the collecting level, at which material is accumulated and judged by surface features; the verifying level, at which provenance is established but effort is undifferentiated; and the analytical level, at which verification is allocated by consequence and uncertainty stated. Four criteria were established: the precision of the question formulated; the ratio of material rejected to collected with the quality of the recorded grounds; the proportion of evaluation conducted laterally; and the explicitness with which residual uncertainty is declared.

DISCUSSION

The results require to be situated within the sharpest controversy in this field, the argument advanced by d. boyd that media literacy instruction has backfired. Her contention is that the central injunctions of such instruction — question authority, do not accept what you are told, do your own research — are precisely those issued by conspiratorial movements, and that students trained in generalised suspicion acquire not discernment but a disposition to distrust established sources while extending credence to material flattering their existing commitments. Scepticism, on this account, is not a neutral faculty improving judgement wherever applied: it is directed by prior commitment, and

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instruction cultivating it without supplying direction amplifies whatever the student already believes. She observes further that the processes by which people accept claims are communal rather than epistemic in the first instance, so that an intervention addressed solely to individual reasoning addresses the wrong mechanism. S. Wineburg draws a different conclusion from the same evidence. His comparative studies established that students, and indeed academics, evaluate digital sources by staying on the page — examining its design, domain, stated purpose and references — while professional fact-checkers leave almost immediately to establish who is behind it, and reach accurate judgements in a fraction of the time. The failure he documents is therefore not an excess of scepticism but an obsolete procedure: vertical reading was reasonable when a document's features carried information about its producer, and is useless when those features are free to imitate. His remedy is correspondingly specific — not a disposition to doubt but a procedure to execute. The disagreement concerns whether the deficiency lies in the disposition cultivated or the procedure supplied. H. Simon's account of attention scarcity indicates why procedure must be economical: a method requiring more attention than the student possesses will not be used however sound, which argues for lateral reading precisely because it is faster than the vertical reading it replaces. M. Caulfield's short ordered sequence of moves shows that the procedural remedy can be specified finely enough to be taught, and his insistence that the first move is to stop — declining to engage with material until its provenance is known — addresses the mechanism boyd identifies, since it interrupts the process by which communal transmission precedes evaluation. The position advanced here is that boyd and Wineburg describe one failure from opposite ends, and that the methodology proposed above satisfies both. boyd is right that instruction issuing the injunction to doubt and stopping there produces the outcome she describes: the injunction is empty, and is filled by whatever the student brought with him. Wineburg is right that the remedy is a specified procedure rather than an intensified disposition, since a procedure can be performed well or badly and corrected, whereas a disposition can only be exhorted. The five-component structure contains no component called scepticism: it contains operations — formulating, rejecting with recorded grounds, establishing provenance laterally, naming contradiction, declaring uncertainty — each assessable. The triage principle answers the remaining objection, conceding what exhortation never concedes, that the student cannot check everything, and converting that concession from a tacit failure into an explicit act of judgement.

CONCLUSION

The study has shown that information-analytical culture must now be formed under conditions that have reversed the premises on which the concept was built: the governing scarcity has moved from information to attention, the surface signals of credibility have become costless and therefore uninformative, and exhaustive verification has become unattainable. A methodology that trains retrieval, teaches surface signals as reliable and issues an unqualified instruction to verify is addressed to a situation that no longer exists. First, a five-component structure was substantiated — need-formulating, search-and-triage, critical-evaluative, analytic-synthetic and value-ethical — in which deliberate rejection, recorded with its grounds, is a component in its own right. Second, three positions of the digital were distinguished: medium, object and environment, an approach employing the first alone being a delivery arrangement rather than a pedagogical one. Third, the triage principle and the verification budget were established, requiring the student to identify the claims upon which his conclusion depends, to expend verification effort upon those and to mark the remainder as unverified. Fourth, a four-stage methodology was elaborated — question formulation, bounded search with a

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rejection log, lateral verification and declared uncertainty — whose central transition is from vertical to lateral reading. Fifth, three levels and four criteria were established, among which the ratio of material rejected to collected, with the quality of the recorded grounds, proved the most informative indicator. The analysis of the controversy over media literacy established that the structure should contain operations rather than dispositions, since an operation can be observed and corrected whereas a disposition can only be exhorted. Further research might address the stability of lateral reading when students work without the obligation to record their procedure.

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