

Attention Capture and Shallow Memory: Social Media, Deep Reading, and Critical Autonomy in Digital Culture

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Abstract: *This article examines the conditions under which social media use may contribute to intellectual impoverishment, understood not as a decline in intelligence but as a situated weakening of sustained attention, elaborative memory encoding, deep reading, and critical judgment. A qualitative, interdisciplinary critical narrative review was conducted through English and Portuguese searches, explicit inclusion and exclusion criteria, and a final corpus of 47 documents, comprising experiments, meta-analyses and systematic reviews, literature reviews, observational and population studies, institutional reports, legal texts, and conceptual works. The review was carried out by a single researcher, without a registered protocol, double screening, or formal risk-of-bias assessment, a limitation that circumscribes the scope of its conclusions. The evidence does not support a uniform or inevitable effect of social media. Outcomes vary according to platform, format, activity, intensity, age, vulnerability, and social and educational context. Nevertheless, business models based on retention, advertising, and data extraction turn attention into an economic resource and encourage recurrent design features such as notifications, infinite scrolling, variable rewards, and rapidly changing short videos. When use becomes intensive, fragmented, compulsive, and mainly passive, these architectures may privilege speed, frequent switching, superficial recognition, and immediate reward while displacing sleep, study, reading, and conversation. Shallow memory, an analytical concept proposed here, describes weak encoding, limited elaboration, and unstable retrieval rather than the disappearance of memory. The article argues that adequate responses must combine self-regulation, pedagogical design, and platform governance.*

Keywords: social media; attention; memory; deep reading; critical thinking.

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I. INTRODUCTION

Social media has become an everyday infrastructure for communication, entertainment, sociability, information, and work. They are not merely channels through which content circulates. They organize sequences of perception, provide public metrics of approval, personalize stimuli, and modulate transitions from one object to another. Discussing their intellectual effects therefore requires moving beyond two opposing simplifications. The first claims that technology is, by itself, destroying the intelligence of a generation. The second dismisses every concern as moral panic, as though all forms of use were equivalent and digital environments were neutral containers. Both avoid the decisive question: which combinations of architecture, practice, individual, and context facilitate or hinder sustained thought?

In this article, "intellectual impoverishment" does not mean a global loss of intelligence quotient, brain degeneration, or permanent incapacity. The expression denotes a functional and contextual reduction in the quality with which information is selected, organized, related, and evaluated. More precisely, it refers to conditions conducive to impoverishment, not to an irreversibly acquired state. An individual may demonstrate considerable competence in one domain while reading hastily, abandoning a line of reasoning at the first discomfort, or confusing familiarity with knowledge in another. The problem is not an impoverished intellectual essence, but the repeated presence of conditions that make it less likely that a person will sustain a question, retrieve premises, compare sources, revise a hypothesis, and accept the time required for understanding.

The article also adopts an operational definition of "shallow memory," an analytical concept proposed herein. The term neither names a clinical category nor assumes that the digital environment eliminates the capacity to remember. It describes episodes in which information is encoded with little elaboration, connected to limited prior knowledge, and retrieved only through external cues or recognition. The classic distinction between levels of processing helps explain why exposure and retention are not synonymous: semantic operations and meaningful relations tend to produce more durable traces than the processing of surface features (Craik & Lockhart, 1972). Shallow memory is therefore the memory of something seen and rapidly displaced, familiar enough to generate confidence but insufficiently structured to support explanation, transfer, or critique.

Deep thinking is understood as the capacity to sustain voluntary attention on a problem, integrate distributed information, construct inferences, test objections, and delay premature closure. Critical thinking, in turn, is not equivalent to negativity or indiscriminate distrust. It involves evaluating the strength of reasons and evidence, distinguishing assertion from demonstration, recognizing uncertainty, and updating judgments. These capacities depend on sustained attention, which maintains focus over time; selective attention, which prioritizes relevant signals among competitors; and divided attention, which allocates resources across simultaneous tasks. The latter may be useful in automated routines, but it becomes costly when two activities require control, working memory, and decision-making.

The adjective "excessive" is used here in a functional sense. The same number of hours may have different meanings: talking to distant relatives, producing an academic video, coordinating collective action, seeking support, and passively scrolling through a feed are not interchangeable experiences. Excess arises when the pattern is difficult to interrupt, conflicts with chosen goals, fragments demanding tasks, or displaces essential activities such as sleep, study, movement, and social interaction. This definition avoids pathologizing every instance of intensive use and prevents a crude metric from replacing analysis of the activity actually performed.

The thesis advanced is that social media do not automatically cause a homogeneous intellectual decline. Their effects are heterogeneous, often small in population averages, and difficult to disentangle from selection, context, and reverse causality. Interdisciplinary reviews of the Internet and cognition converge on the need to analyze individualized impacts, activities, and contexts rather than assume a single digital effect (Firth et al., 2019, 2024). Nevertheless, when business models designed to capture attention intersect with intensive, fragmented, compulsive, and passive use, several risk mechanisms become plausible and empirically supportable. These include rapid switching, interruptions, immediate-reward seeking, shallow encoding, uncritical cognitive offloading, and repeated exposure to emotionally salient content. Over time, these mechanisms may consolidate habits that are incompatible with deep reading, retention, and critical elaboration, especially when they also displace sleep, study, and conversation.

This formulation shifts the question from "Are social media harmful?" to "Which platforms, features, and practices, for whom, under what circumstances, and compared with what?" The guiding question is: through which mechanisms and under what conditions can the architecture and use of social media hinder sustained attention, elaborative memory processing, deep reading, and critical judgment? The objective is to integrate evidence from fields that usually operate separately and to calibrate the causal reach of each body of evidence. The original contribution is a four-level relational model comprising platform architecture, patterns of use,

cognitive mechanisms, and the displacement of practices in unequal contexts. This shift is both methodological and political. It is methodological because it requires distinguishing correlation from causation, acute effects from enduring change, and self-perceived performance from objective performance. It is political because it prevents all responsibility from being assigned to users, as though individual choices occurred outside systems designed to prolong engagement. The following sections examine the attention economy, fragmentation, memory, reading, epistemic effects, and inequalities before proposing responses at three levels: individual, educational, and structural.

II. METHODOLOGICAL PROCEDURES

This study was conducted as a qualitative, interdisciplinary, problem-oriented critical narrative review. This approach is appropriate for a question that cuts across cognitive psychology, communication, education, health, political science, and regulation. The aim was not to estimate a single pooled effect of "social media use," because this variable encompasses markedly different exposures. Instead, the review sought to reconstruct mechanisms, compare convergent and divergent findings, and assess the extent to which different research designs support inferences about attention, memory, reading, and judgment.

Bibliographic searches were conducted on August 1-2, 2026, in two databases: PubMed, for biomedical, psychological, and public-health literature, and the ACM Digital Library, for human-computer interaction research addressing interface architecture, short-form videos, and design interventions. Publisher, journal, and institutional repository websites - including those of the APA, Nature, Science, PNAS, Springer, Wiley, Taylor & Francis, Elsevier, the Brazilian federal government, Cetic.br, UNESCO, and the National Academies Press - were used to locate full texts and verify metadata, not as structured retrieval databases.

Structured retrieval therefore focused on biomedical, psychological, and human-computer interaction literature. Major databases for communication, education, the social sciences, law, and Latin American scholarship - including PsycINFO, Scopus, Web of Science, ERIC, and SciELO - were not systematically searched. Documents from these fields entered the corpus primarily through backward reference tracking of evidence syntheses and direct consultation of normative and institutional sources. This concentration is compatible with a critical narrative review, but it limits claims of interdisciplinary coverage and must be considered when interpreting the results.

Search strings combined English and Portuguese equivalents of "social media" AND attention; "media multitasking" AND "cognitive control"; "short-form video" AND (attention OR "prospective memory"); "screen reading" AND comprehension; "cognitive offloading" AND memory; "social media" AND misinformation; "social media" AND "adolescent well-being"; "social media" AND ("infinite scroll" OR notifications OR autoplay); "digital self-control tools" AND intervention; "redes sociais" AND atenção AND memória; "vídeos curtos" AND atenção; and "redes sociais" AND adolescentes AND Brasil. Parentheses were used when conjunctions and disjunctions were combined so that alternatives applied to the thematic term rather than to the entire query. Backward reference tracking of synthesis studies complemented the searches.

The review included peer-reviewed articles directly relevant to the study axes; meta-analyses; systematic reviews; experiments; longitudinal or intensive everyday-life studies; indispensable conceptual works; and primary institutional or normative documents. Publications from 2015 to 2026 were prioritized, while earlier works were retained when foundational to the mechanism under examination. English- and Portuguese-language texts were accepted when their authorship, title, publication venue, and DOI or official address could be verified. Duplicates, news reports, commercial or opinion pieces, items without verifiable metadata, and tangential studies whose design did not support the required inference were excluded. The final corpus comprised 47 documents, whose distribution by type is presented in Table 1.

Table 1 - Composition of the corpus by document type

Document type	n	Representative examples
Experimental, laboratory, field, and implementation studies	14	Rubinstein, Meyer, and Evans (2001); Stothart, Mitchum, and Yehnert (2015); Baughan et al. (2022); Ruiz, Molina León, and Heuer (2024)
Literature reviews, conceptual reviews, and umbrella reviews	8	Firth et al. (2019, 2024); Risko and Gilbert (2016); Valkenburg, Meier, and Beyens (2022)
Meta-analyses and systematic reviews with meta-analysis	7	Delgado et al. (2018); Schwabe et al. (2022); Monge Roffarello and De Russis (2023); Nguyen et al. (2025)
Observational, population, and platform-data studies	7	Bakshy, Messing, and Adamic (2015); Orben and Przybylski (2019); Goodyear et al. (2025)
Institutional documents and consensus reports	5	National Academies of Sciences, Engineering, and Medicine (2024); UNESCO (2023)

Document type	n	Representative examples
Conceptual and theoretical works	3	Craik and Lockhart (1972); Van Dijck, Poell, and De Waal (2018)
Brazilian legal instruments	3	Brazil (2025a, 2025b, 2026)
Total	47	

Source: prepared by the author.

No numerical record was maintained for the identification, screening, and exclusion stages. Accordingly, a quantitative selection flow comparable to that used in a systematic review is not presented; the corpus is described by document type rather than by counts of records retrieved and excluded.

Analytical reading was recorded in a matrix with six fields: thematic axis, exposure or design feature, outcome, study design, causal reach, and limitations. The synthesis addressed four questions. First, what exposure was measured: total time, problematic use, content type, active or passive mode, media simultaneity, or a specific feature? Second, what outcome was observed: self-report, cognitive task, academic performance, sharing behavior, or well-being? Third, does the design support an inference of association, immediate effect, or enduring change? Fourth, which moderators and alternative explanations remain? Table 2 presents the hierarchy used to prevent findings of different kinds from supporting conclusions of equal weight.

Table 2 - Hierarchy of the evidence mobilized and scope of inference

Axis	Main evidence	Supported inference	Key limitations
Engagement architecture	Interdisciplinary review, implementation study, and institutional guidance (Montag et al., 2019; Baughan et al., 2022; American Psychological Association, 2024)	Moderate confidence that specific features alter immediate experience and encourage recurrent use	Small HCI samples, opaque corporate data, and limited longitudinal observation
Interruption and task switching	Experiments, replications, and reviews (Rubinstein et al., 2001; Stothart et al., 2015; Wiradhany & Nieuwenstein, 2017)	High confidence in acute interruption costs; low confidence in a permanent general deficit	Ecological generalizability and prior selection among intensive users
Memory and cognitive offloading	Cognitive experiments and reviews (Sparrow et al., 2011; Risko & Gilbert, 2016)	High confidence in strategic adaptation of memory; low confidence in claims of decline	Laboratory tasks do not fully reproduce everyday use
Screen reading	Meta-analyses and experimental studies (Delgado et al., 2018; Clinton, 2019; Schwabe et al., 2022)	Moderate confidence in a small paper advantage under specific conditions, not in universal screen inferiority	Heterogeneity of devices, genres, time constraints, and strategies
Short-form videos	Experiments and meta-analysis (Chiossi et al., 2023; Barton & Smyth, 2025; Nguyen et al., 2025)	Moderate confidence in immediate effects or associations; low confidence in persistence	Small experimental samples and predominance of self-report and cross-sectional designs in observational studies
Misinformation	Experiments and platform data (Pennycook et al., 2018; Pennycook et al., 2021; Guess et al., 2023)	High confidence regarding repetition and accuracy interventions; moderate confidence in cross-platform generalization	Electoral contexts and changing algorithmic rules
Adolescence and well-being	Population, everyday-life, and review studies (Orben & Przybylski, 2019; Beyens et al., 2020; Valkenburg et al., 2022)	High confidence in heterogeneity and small averages; low confidence in universal causality	Broad time measures, self-reports, and individual differences
Interventions and policies	Systematic review with meta-analysis, interface experiments, and an observational school study (Monge Roffarello & De Russis, 2023; Ruiz et al., 2024; Goodyear et al., 2025)	Low-to-moderate confidence: friction may help, but bans or isolated tools do not guarantee benefits	Short follow-up, small samples, and absence of control groups or randomization in school policies

Source: prepared by the author based on the review corpus.

The confidence classifications used in Table 2 are analytical and comparative. They reflect the reviewer's judgment regarding convergence among research design, consistency of findings, and proximity between the measure employed and the outcome of interest. They do not correspond to the application of formal grading systems such as GRADE and should not be read as equivalent to protocol-based certainty levels. Their purpose is to prevent an acute experiment with 60 participants and a meta-analysis of dozens of cross-sectional studies from supporting claims of the same weight.

The strategy has additional limitations. Selection and classification were conducted by a single reviewer, without a registered protocol, duplicate screening, or a formal risk-of-bias instrument; the review is therefore not exhaustive and does not replace a systematic review. A substantial share of the literature relies on convenience samples, self-reports, and cross-sectional measures. Platforms change faster than publication cycles, and researchers rarely have complete access to recommendation, exposure, and engagement data. Studies are also concentrated in high-income countries, although material and cultural inequalities profoundly alter the meaning of use. The conclusions are consequently expressed at different confidence levels: well-established experimental mechanisms are not automatically extrapolated to long-term social effects, and population-level associations are not treated as proof of individual harm.

III. FROM PLATFORM TO HABIT: THE ATTENTION ECONOMY AND ARCHITECTURES OF RECURRENCE

The category "social network" may suggest a unified public space, but platforms are specific corporate and technical arrangements. They combine databases, advertising, interfaces, recommendation systems, moderation rules, creators, and markets for visibility. Platformization describes precisely the penetration of these infrastructures into social and institutional practices, accompanied by a reorganization of data, markets, and governance (Poell et al., 2019). In this configuration, attention is not merely a condition of experience. It is a resource that is measured, segmented, and converted into revenue.

The prevailing economic incentive does not require every item of content to be false or cognitively poor. Rather, it requires the sequence to keep users present and predictable. Session time, return visits, clicks, comments, shares, and video completion serve as signals for optimizing recommendation and advertising. The result is systematic selection in favor of content that interrupts, arouses, or promises rapid reward. The problem does not lie in a single intention to "addict" people, but in the structural alignment between retention and profit. When engagement is the central metric, cognitive costs borne by users may remain external to corporate calculations.

Features such as notifications, autoplay, infinite scrolling, public counts, and variable rewards reduce natural stopping points. Reviews integrating psychological and economic theories describe how these features may intensify recurrent use without attributing an identical effect to each one (Montag et al., 2019). In a book, the end of a chapter or the turn of a page makes a unit visible. In an infinite feed, the next item arrives before the decision to continue becomes fully conscious. Low friction encourages recurrence: a few seconds of waiting, difficulty in a text, or an unpleasant emotion may be sufficient to prompt the opening of another application. Habits are formed not only through the pleasure of content, but through repeatedly enacting a simple response to varied internal states such as boredom, anxiety, loneliness, and effort.

This architecture helps explain why use cannot be interpreted solely as the expression of previously formed preferences. Preferences are also shaped by availability, order, and salience. The system learns which stimuli prolong engagement; users learn that rapid switching provides novelty. The process is reciprocal. By personalizing the environment, the platform increases the likelihood of finding something sufficiently relevant to prevent disengagement. By responding, the user supplies new data. In this sense, the platform society converts relationships and public practices into flows governed by partially opaque criteria (Van Dijck et al., 2018).

It is important, however, not to treat every convenience feature as manipulation. Recommendations may reduce search costs, connect minority audiences, make specialized knowledge accessible, and help creators reach interested publics. Notifications may be essential for work and care. The same function acquires different value depending on whether it is configurable, understandable, and proportionate to the user's purpose. The critical issue is asymmetry: companies observe millions of interactions and continuously adjust their systems, whereas individuals receive limited explanations and bear almost the entire burden of resistance.

For deep thinking, the principal consequence of this economy is not an isolated message, but the construction of a temporal regime. The value of content is judged within seconds; the decision to remain must be renewed in the face of constant alternatives; and silence appears as an absence of stimulation rather than a condition for elaboration. The norm of immediate responsiveness invades tasks that depend on latency. Reading a difficult argument, writing, demonstrating a hypothesis, or recalling without external consultation involves periods in which progress is not visible. If every discomfort triggers an alternative reward, difficulty is no longer worked through and instead becomes a cue to exit.

Institutional analysis is especially relevant for children and adolescents. The consensus report of the U.S. National Academies recommends explicit attention to design, transparency, and accountability, recognizing that benefits and risks cannot be reduced to total screen time (National Academies of Sciences, Engineering, and Medicine, 2024). The American Psychological Association likewise distinguishes content, design features, and developmental stage, including specific recommendations concerning interactions that prolong use and amplify

social comparison (American Psychological Association, 2023, 2024). These positions do not demonstrate that a particular feature causes harm in every young person.

An implementation study helps delimit what design evidence can actually support. For four weeks, 43 participants used an alternative Twitter client in which internal interface interventions - such as reading-history labels and customized lists - and external interventions - such as usage statistics and a time-limit dialog - were tested. Reports and interviews indicate that some users recognize episodes of absorption in which they fail to retain what they have read and that certain features make this perception more accessible. The small sample and exploratory character preclude generalization, but the study shows that normative dissociation can be addressed as a design variable rather than merely as a failure of self-control (Baughan et al., 2022). Taken together, these sources indicate that design is a legitimate health and education variable, not a mere interface detail.

The attention economy therefore provides the first level of explanation: it organizes incentives to multiply opportunities for capture and minimize interruptions to consumption. It remains necessary to show how these incentives meet limited cognitive capacities. The transition from platform to habit is not automatic, because it depends on self-regulation, context, and purpose. Even so, an environment that rewards frequency, switching, and reaction creates conditions different from those required for voluntary concentration. It is at this intersection between persuasive architecture and cognitive limitation that fragmentation becomes intellectually consequential.

IV. FRAGMENTED ATTENTION: INTERRUPTION, SWITCHING, AND THE FORMATION OF COGNITIVE HABITS

The subjective experience of doing several things at once conceals a more common operation: rapidly switching between goals. When two tasks require selection and decision-making, the brain must inhibit one set of rules, activate another, and reconstruct the point at which the previous activity was left. Task-switching experiments show measurable costs in time and error even when the switch is predictable (Rubinstein et al., 2001). These costs may appear small at each transition, but they accumulate and, more importantly, disrupt the representational continuity required by complex activities.

An interruption does not end when the device is put away. The concept of attention residue describes the persistence of cognitive resources tied to the previous task, especially when it remains unfinished (Leroy, 2009). After responding to a message, part of one's attention remains attached to the conversation, the problem, or the expectation of a reply. In reading, this means rereading passages, losing relationships among premises, and operating with an impoverished representation of the argument. In writing, it means resuming local goals without fully recovering the global structure. The intellectual cost is less dramatic than "losing the ability to think," but far more commonplace: producing a sequence of fragments that resemble work without consolidating a line of reasoning.

Notifications illustrate the difference between a brief event and a cognitive effect. In an experimental study, simply receiving cell-phone alerts impaired performance on an attentional task even without direct interaction with the device (Stothart et al., 2015). An alert introduces a social or informational possibility that competes with the current goal. Its power does not depend solely on sound. The expectation that something might arrive also encourages internal and external checking. Disabling notifications removes an explicit source but does not immediately eliminate the habit of seeking novelty, because the response may already have become self-initiated.

Sustained attention is not the opposite of flexibility. Switching may be rational when priorities change, and digital environments cultivate genuine skills in searching, screening, and coordination. The problem arises when switching ceases to serve the goal and begins to serve the most salient stimulus. Selective attention, which should filter distractions, is subjected to a stream in which every item has been optimized to win the competition. Divided attention, in turn, preserves the appearance of productivity while linguistic and conceptual tasks compete for shared resources. Reviews of media multitasking and academic performance generally find a negative relationship, while also documenting heterogeneous measures and causal uncertainty (May & Elder, 2018).

An influential study associated heavy simultaneous media use with poorer filtering of distractions and poorer cognitive control (Ophir et al., 2009). It would be tempting to treat this as proof that the practice changes the brain. Replications and a subsequent meta-analysis, however, found a weak association that became nonsignificant after correction for small-study effects (Wiradhany & Nieuwenstein, 2017). This divergence is instructive. It does not erase well-established experimental costs of task switching, but it precludes the conclusion that people who report more simultaneous media use consequently possess a stable, general deficit. Pre-existing differences in personality, motivation, or environment may influence both use and performance.

Reviews of the field note that evidence on media multitasking is consistent regarding some immediate costs, but less conclusive regarding enduring trait changes (Uncapher & Wagner, 2018). This distinction should guide the vocabulary used. A fragmented session may produce poorer comprehension at that moment without

permanently "shortening" attention. The progression from repeated acute effects to cumulative consequences remains a developmental hypothesis that most of the corpus does not test longitudinally. Two pathways make it plausible without establishing it as fact. The first is habit learning: when effort arises, the individual practices leaving rather than remaining. The second is displacement: hours of concentration that did not occur cannot contribute to repertoire, fluency, and tolerance for difficulty. The argument therefore posits neither instantaneous mechanical harm nor a demonstrated permanent change.

Social media add a social component to interruption. Unanswered messages may be perceived as failures of reciprocity; trends generate fear of exclusion; and public metrics turn pauses into opportunities to monitor one's own standing. Interruption thus competes not only through novelty, but also through duties and identities. Individual measures that ignore this dimension may fail because they ask users to suspend, unilaterally, norms of availability sustained by the group. Classrooms, teams, and families must negotiate expectations of responsiveness rather than merely recommend willpower.

Formats must also be distinguished. A social platform used for 40 minutes to participate in a study group may sustain joint attention; the same duration spent in a sequence of unrelated clips requires frequent resetting. Conversation, creation, revision, and research impose demands different from those of passive scrolling. Measuring minutes alone erases the temporal structure of experience. "Excessive use" must therefore encompass the frequency of interruptions, loss of control, conflict with goals, and resumption costs, in addition to duration.

The most defensible diagnosis is that social media increase the availability of interruptions and alternative rewards precisely where cognition already incurs switching costs. There is insufficient evidence to claim that all users develop a permanent inability to focus. There is robust evidence that complex tasks deteriorate when interrupted and that certain designs make interruption more likely. The educational issue is therefore no longer one of teaching young people to "pay attention" as an abstract moral virtue. Instead, environments must be organized so that attention is not required to overcome an asymmetric competition every minute.

V. FROM FAMILIARITY TO RETENTION: SHALLOW MEMORY, COGNITIVE OFFLOADING, AND THE ILLUSION OF KNOWLEDGE

Memory is not a repository that automatically records everything that passes through the senses. Future recall depends on selection, encoding, elaboration, consolidation, and retrieval. Rapidly consumed content may produce a sense of exposure without creating a representation that can be reconstructed. The difference between recognizing a sentence in a feed and explaining its argument without support exemplifies what this article calls shallow memory. It is not a memory smaller in volume, but a structure with few relationships, poor source discrimination, and strong dependence on external cues.

Levels-of-processing theory proposes that retention is favored when material is processed semantically and related to meaning, in contrast with superficial operations (Craik & Lockhart, 1972). Speed does not prevent all elaboration, and brief formats may condense relevant ideas. Nevertheless, rapid succession reduces opportunities to ask, "How does this connect with what I know?", "What would constitute a counterexample?", or "Where did this claim originate?" Without such operations, perceptual fluency may be interpreted as mastery. Users feel that they know because they have seen something repeatedly, not because they can retrieve, apply, or justify it.

The possibility of consulting information at any time also reorganizes what is remembered. In experiments on the so-called Google effect, participants who expected future access to information remembered less of the content and more about where to find it (Sparrow et al., 2011). This result does not prove memory deterioration. It may represent efficient adaptation: human groups have always distributed knowledge across people, records, and tools. The concept of cognitive offloading describes precisely the use of the environment to reduce internal demands, from writing down an appointment to using a navigation system (Risko & Gilbert, 2016).

Offloading is intellectually productive when it frees resources for analysis, but risky when individuals do not retain a core body of knowledge that enables them to formulate good questions and evaluate answers. Without internal knowledge, each search begins almost from scratch; the most salient result appears sufficient; and the source is not compared with prior models. The relevant boundary is not between "natural" memory and tools, but between deliberate support and opaque dependence. A calendar enhances autonomy because users know what they have delegated and how to retrieve it. A personalized feed may reduce autonomy when it decides what reappears without users understanding the criteria.

Online search may also inflate estimates of one's own knowledge. In experiments, searching for explanations on the Internet increased perceptions of internal knowledge even in domains that were not directly researched (Fisher et al., 2015). The proximity between question and answer makes the boundary between knowing and knowing how to access less visible. On social media, this illusion may be reinforced by

summaries, headlines, comments, and excerpts that provide a conclusion before the chain of evidence. The epistemic problem is not consultation itself, but the loss of awareness of dependence and, with it, the willingness to verify.

Retrieval practices help reverse this tendency. Testing one's memory rather than merely rereading produces benefits for long-term retention (Roediger & Karpicke, 2006). This finding shows why some forms of digital use can strengthen rather than weaken memory. Writing a synthesis without copying, answering a question before searching, explaining a concept to another person, and spacing reviews transform social media into supports for elaboration. The criterion is not the physical medium, but the cognitive activity. A screen may support deep study; a book may be skimmed mechanically.

Shallow memory also concerns the metadata of belief. When people remember a claim but not who made it, in what context, or with what degree of evidence, they retain the content while losing the capacity to evaluate it. The combination of advertising, opinion, humor, news, and testimony within the same visual sequence impairs source tagging. The fragment later reappears as familiarity. Repetition increases the perceived truth of even false news, a phenomenon observed experimentally by Pennycook, Cannon, and Rand (2018). The weakness therefore consists not only in forgetting, but in remembering without provenance.

There is a productive tension between internal and distributed memory. No intellectual education requires memorizing all available information, and literate culture has always relied on external supports. What has changed is the scale, speed, and personalization of access. When the environment answers before individuals attempt retrieval, the opportunity to diagnose gaps disappears. When it provides only one answer, comparison weakens. When it changes continuously, the likelihood of consolidation decreases. Pedagogical design should therefore alternate access and lack of access: moments for exploring sources, moments for reconstructing from memory, and moments for comparing that reconstruction with evidence.

Calling this pattern "shallow memory" is legitimate only if the term retains precision. It does not describe a collective disease or an essence of younger generations. It names a functional pattern produced when exposure replaces elaboration, recognition replaces retrieval, and access replaces understanding. Social media may favor this pattern, but they may also host study communities, archives, explanations, and authorship practices. The effect depends on how information is processed after it appears. The true dividing line is not digital versus analog, but passage versus sustained engagement.

VI. DEEP READING UNDER PRESSURE: SCREENS, HYPERTEXT, AND SHORT-FORM VIDEOS

Deep reading requires more than decoding words. Readers must keep propositions active, construct coherence among distant parts, generate inferences, monitor failures of understanding, and integrate the text with prior knowledge. This activity is temporally demanding: some sentences acquire meaning only retrospectively; difficult concepts require rereading; and ambiguities must remain open. Flow-based social media introduce a different temporality, oriented toward rapid selection, reaction, and transition. The conflict is not between screens and paper in the abstract, but between reading regimes.

Meta-analyses comparing media have found a small advantage for paper in comprehension, especially under time pressure and for informational texts (Delgado et al., 2018; Clinton, 2019). For narratives, another meta-analysis found no significant negative effect of screen reading, reinforcing the moderating roles of genre and task (Schwabe et al., 2022). These results do not support the claim that screens prevent deep reading. Devices, tasks, and generations vary; search, accessibility, and annotation features may benefit some readers. The average difference instead points to specific conditions: navigation, scrolling, excessive hyperlinks, less apparent text length, and greater availability of distractions may increase monitoring demands. If a digital environment is stable, free of alerts, and equipped with annotation tools, part of the disadvantage may be reduced.

Reading habits also matter. A person who enters a browser accustomed to scanning may transfer a screening strategy to a text that requires study. Headlines, highlights, and short paragraphs cultivate a form of reading that is useful for locating information but insufficient for reconstructing an argument. There is no single competence called digital reading. Reading may serve searching, communication, navigation, aesthetic experience, or analysis. The problem arises when a strategy that is efficient for one purpose becomes the automatic default for all others.

Short-form videos intensify the issue by combining brief duration, strong audiovisual salience, personalized recommendation, and rapid transitions between contexts. An experiment with 60 participants found poorer performance on a prospective-memory task after a condition involving short-form videos and rapid switching than after other forms of interruption (Chiossi et al., 2023). A later study that manipulated switching pace found a significant decline in accuracy only under unlimited switching, not limited switching, suggesting that the mechanism may lie less in brevity alone than in the speed of contextual change (Barton & Smyth, 2025).

These are small studies of acute effects. They support a mechanistic hypothesis, not a claim of permanent cognitive decline.

A recent meta-analysis of short-form video use assembled a broader evidence base of 71 studies and more than 98,000 participants. It found a moderate average association between heavier use and poorer cognitive performance, with the strongest coefficients for attention and inhibitory control; the association with mental-health indicators was weaker, although consistent for stress and anxiety (Nguyen et al., 2025). However, most studies were cross-sectional and relied on self-reports. People with attentional difficulties may prefer high-switching formats; stress and sleep deprivation may simultaneously increase use and reduce performance; and measures of "problematic use" may overlap with symptoms. The synthesis increases confidence that a meaningful relationship exists, but does not by itself resolve causal direction, duration, or generalizability. The authors also note that cognitive domains such as memory and reasoning have been studied infrequently, precluding extension of the findings to cognition as a whole.

Brief formats also offer benefits. A concise visual demonstration may introduce a concept, lower barriers to entry, and arouse curiosity. Specialized creators make technical vocabularies accessible and connect learners with communities. For time-constrained students, a video may initiate a learning path that would not otherwise occur. Risk arises when the introduction replaces the path itself. Being able to name a concept, repeat its conclusion, or recognize a graph is not equivalent to understanding its assumptions, methods, and limitations. Education can use the point of entry if it deliberately builds the transition from fragment to full work, example to principle, and explanation to problem.

This transition requires activity design. After viewing a video, students may record its central claim, identify the evidence, formulate an objection, and seek a long-form source. A sequence of posts may be reorganized into an argument map. Comparing a news report, the study it cites, and the report's circulation helps reveal losses of context. Pedagogical use then ceases to compete with digital culture and begins to teach it as an object of inquiry. A review of digital media and school learning likewise emphasizes that benefits depend on intentionality and teacher mediation, whereas technological adoption without a pedagogical project may simply reproduce superficiality (Paixão, 2025).

At the cultural level, pressure on deep reading does not come only from the device. Long working hours, commuting, precarious work, lack of libraries, and exhaustion reduce the time and energy available for reading. Blaming the smartphone may obscure these conditions. At the same time, the device concentrates precisely the services that compete for the remaining intervals. Protecting reading requires material and temporal infrastructure: collections, quiet spaces, access to suitable digital versions, school time for reading, and social expectations that do not demand continuous availability.

The most useful contrast therefore does not pit nostalgia for paper against celebration of the screen. It distinguishes text-governed reading from stimulus-competition-governed reading. In the former, pace can slow as difficulty increases; in the latter, difficulty increases the relative value of the immediate alternative. The goal should not be to eliminate all technology, but to restore readers' control over pace, sequence, and interruption. Deep reading in a digital environment is possible, but it must be designed and practiced against incentives that favor rapid passage.

VII. EPISTEMIC EFFECTS: REPETITION, PERSONALIZATION, AND CRITICAL JUDGMENT

The intellectual effects of social media are not confined to individual attention. Platforms organize ecologies of visibility in which certain claims reach audiences, recur, and acquire credibility. Information competes for sharing in low-friction environments, and selection criteria may privilege novelty, emotion, and identity. A large-scale study found that false news spread farther, faster, and more broadly than true news on the platform examined, with substantial participation by human users (Vosoughi et al., 2018). This finding does not mean that falsehood always prevails, but it shows that informational value and circulation value may diverge.

Repetition is a central mechanism. Prior exposure increases the perceived accuracy of false news, even when the content is implausible (Pennycook et al., 2018). Within a feed, repetition is not always recognized as such: the same proposition reappears in visually distinct videos, memes, comments, and headlines. The resulting familiarity may be mistaken for independent consensus. Memory preserves the proposition and loses its relationships to origin, precisely the separation that favors superficial judgment.

Another mechanism is attention directed toward the wrong criteria. Users may share content for humor, belonging, indignation, or social utility without considering accuracy. Experiments show that subtle prompts to think about accuracy can improve the quality of content that people report being willing to share (Pennycook et al., 2021). This result is important because it avoids attributing all misinformation to incapacity or bad faith. The environment often makes goals other than truth more salient. Altering the moment of decision can reactivate a criterion that users possess but were not applying.

Media-literacy interventions can also increase discernment. A field experiment in the United States and India found improved differentiation between mainstream and false news after a brief intervention, although effect magnitude and persistence varied (Guess et al., 2020). Critical thinking is therefore trainable, but it cannot be reduced to a checklist of signs. Rigid strategies, such as distrusting every emotion or all simple language, may produce generalized cynicism. Epistemic education must include lateral searching, source comparison, understanding of methods, and the capacity to calibrate confidence.

Personalization and homophily raise the issue of echo chambers. A comparative analysis of platforms found patterns of segregation and aligned-content consumption, with different intensities depending on platform architecture (Cinelli et al., 2021). Another investigation found that individual choices and algorithmic ranking both contributed to limiting exposure to ideologically discordant content, although user selection played an important role (Bakshy et al., 2015). It is inaccurate to imagine an omnipotent algorithm that determines beliefs. Social relationships, preferences, and identities already structure exposure, and systems interact with them.

Experiments conducted during an election campaign reinforce the need for caution. Changing a feed-ranking system significantly altered the content seen, but produced no detectable short-term effects on several political attitudes assessed (Guess et al., 2023). Exposure and persuasion are not equivalent. A platform may reorganize agendas, emotions, and opportunities for contact without immediately changing a stated opinion. Conversely, the absence of an effect over several weeks does not prove long-term neutrality. Null results delimit claims and prevent totalizing narratives, but leave open questions concerning cumulative learning and the power to define visibility.

Intellectual impoverishment acquires a public dimension here. When attention is allocated through engagement metrics, arguments that require context are disadvantaged relative to compact, identity-laden claims. Rapid response is rewarded; later correction receives less reach; and doubt may be interpreted as weakness. This ecology does not eliminate critical thinking, but it increases its cost. It requires users to suspend a socially reinforced sequence, leave the platform, consult documents, and return with a less simple conclusion.

There are also genuine epistemic gains. Social media enable experts to respond rapidly, previously marginalized testimonies to enter public debate, and communities to conduct collective verification. Institutional errors can be challenged and public data translated. The same system that accelerates rumors may accelerate corrections. The difference depends on incentives, trust, governance, and competencies. A balanced critique does not ask whether social media produce truth or falsehood, but which processes receive greater visibility and encounter less friction.

In this environment, critical thinking must include an understanding of infrastructure. Evaluating content alone is insufficient; users must ask why it appeared, what action it seeks to provoke, which data guided its recommendation, and what information is absent. This algorithmic literacy does not require knowledge of the exact code. It requires recognizing that order, repetition, and popularity are constructed. Autonomy begins when users perceive the feed as a commercial hypothesis about what will keep them engaged rather than a neutral sample of the world.

VIII. YOUTH, SCHOOLING, AND INEQUALITIES: RISKS, DISPLACEMENTS, AND BENEFITS

Adolescents occupy a central position in the debate because they are undergoing a period of intensive social learning, identity construction, and sensitivity to peer evaluation. This does not make them passive or uniformly vulnerable. A review of findings on digital technology and well-being found very small negative associations in population averages (Orben & Przybylski, 2019). Intensive everyday-life studies also show that the effect of use on well-being differs from one adolescent to another, including negative, null, and positive responses (Beyens et al., 2020). An umbrella review confirms that small average effects coexist with differences by individual, content, and context (Valkenburg et al., 2022).

These findings rule out universal claims but do not justify indifference. A small mean effect may conceal meaningful effects in subgroups and does not necessarily measure reading, memory, or learning. Adolescents with pre-existing distress, limited support, exposure to harassment, or nighttime use may face greater risks. Others find belonging, health information, creative expression, and identity support. The National Academies report concludes that the evidence does not permit a simple explanation and recommends greater transparency, data access, and protection oriented toward design features (National Academies of Sciences, Engineering, and Medicine, 2024).

In Brazil, social media use increases with age but has not followed a linear trajectory over time. The 2025 ICT Kids Online Brazil survey recorded use during the previous 12 months among 33% of Internet users aged 9-10, 63% of those aged 11-12, and 89% of both the 13-14 and 15-17 age groups. Among children aged 9-10, the proportion had been 47% in the immediately preceding edition; among those aged 11-12, the 2025 value was below the 76% peak recorded in 2021; and percentages in the two older groups remained stable relative to the previous year. The same survey found that Internet access at school fell from 51% to 37% (Brazilian Network Information Center, 2026). Data collection occurred after the federal restriction on device use in basic

education came into force, making the temporal coincidence noteworthy. This is, however, an inference of the present article rather than a causal test: the survey is descriptive, does not randomize exposure, and does not isolate the law from parallel changes in public debate, family mediation, and the availability of other platforms.

The displacement mechanism helps formulate risks without assuming a neurotoxic action of the device. Time devoted to one activity replaces alternatives. When social media encroach upon sleep, they may indirectly affect attention and memory. A meta-analysis found an association between access to or use of portable devices at night and adverse sleep outcomes in children and adolescents, while emphasizing the low quality and heterogeneity of the observational evidence (Carter et al., 2016). The result supports caution, not a universal threshold. Timing, emotional arousal, light, messages, and expectations of contact may all contribute to the process.

At school, the mere presence of a mobile phone may facilitate consultation, accessibility, and documentation, but it may also multiply private interruptions within a collective activity. Law No. 15,100 of January 13, 2025 restricted students' use of personal portable electronic devices during classes, recess, and breaks in Brazilian basic education, while preserving pedagogical, accessibility, and necessity-based exceptions (Brazil, 2025a). The measure recognizes that individual choices alone cannot resolve a problem within a shared environment. Its effectiveness, however, depends on understandable rules, alternatives for social interaction, teacher education, and infrastructure. In an observational study of English schools, more restrictive policies were not associated with less total phone or social media use or with better well-being indicators. This does not establish causal ineffectiveness, but it does show that an isolated school ban is insufficient (Goodyear et al., 2025). Storing devices without rebuilding practices of reading and dialogue merely removes one competitor.

The Digital Statute for Children and Adolescents, enacted through Law No. 15,211 of September 17, 2025, broadens the focus to protective duties in digital environments (Brazil, 2025b). It entered into force on March 17, 2026 under Article 41-A, added by Law No. 15,352 of February 25, 2026 (Brazil, 2026). This perspective is more appropriate than transferring the entire burden to families and schools. Children do not negotiate on equal terms with data-personalized systems tested at scale. At the same time, protection must not mean total surveillance or digital exclusion. Rights to participation, information, privacy, and development must be reconciled. Proportionate measures, protective defaults, and avenues for appeal are preferable to indiscriminate solutions. Because the statute is recent, its effects on exposure, interface design, and school practice have not yet been empirically evaluated; this constitutes a research agenda, not an available conclusion.

Inequality cuts across all these mechanisms. Higher-income families may provide quiet rooms, books, cultural activities, stable connectivity, suitable devices, and adult time for mediation. Others depend on a shared mobile phone for nearly all access, work long hours, and have fewer safe spaces for social interaction. Recommending "replacing the screen with a book" without ensuring access to books, lighting, and time reproduces privilege as advice. UNESCO warns that educational technology must be subordinated to pedagogical goals, equity, and evidence rather than treated as a self-sufficient solution (UNESCO, 2023).

There is also inequality in the type of participation. Users with prior knowledge and guidance may employ social media to create, seek sources, maintain relationships, and disseminate work. Users subjected to more predatory offerings, disguised advertising, and low information literacy may be more exposed to passive consumption and fraud. Access therefore does not end exclusion. An inequality of autonomy emerges: those who control notifications, choose tools, and transform information into projects obtain gains different from those guided by automated recommendation.

In education, the response must avoid two symmetrical failures. The first is prohibition without curriculum, which protects certain moments but leaves students without criteria for the remainder of their lives. The second is the uncritical celebration of innovation, which introduces platforms merely because they appear current. Educational evidence indicates that outcomes depend on mediation, teacher preparation, and purpose (Paixão, 2025). Schools must teach both how to use and how to interrupt, how to search and how to remember, how to publish and how to revise.

Recognizing benefits does not weaken the critique. Social media sustain friendships, support, humor, authorship, informal learning, and political participation. For geographically isolated young people or members of minority groups, these spaces may be essential. The aim is not to restore an idealized predigital life that was never equally accessible. It is to reduce patterns that exploit vulnerabilities and expand conditions for chosen uses. The question of justice is not merely how long each young person remains connected, but who determines that time, with which options, and to produce whose value.

IX. REBUILDING THE CONDITIONS FOR DEPTH: INDIVIDUAL, PEDAGOGICAL, AND STRUCTURAL RESPONSES

If the problem results from the interaction of design, habit, and context, no single intervention will suffice. Individual recommendations may improve experience but cannot correct corporate incentives. School rules may protect classroom time but cannot reorganize a student's night. Regulation may limit practices but

does not teach source interpretation. Rebuilding deep thinking requires a three-level politics of attention that articulates personal autonomy, educational institutions, and platform responsibility.

At the individual level, the first step is to replace abstract goals with environmental design. "Use less" provides little guidance. It is more effective to define interruption-free blocks for demanding tasks, remove nonessential notifications, place the device outside the visual field, establish stopping points, and separate communication applications from recommendation feeds. The goal is not digital purity, but a reduction in the number of decisions that require resistance. If every minute depends on self-control, the system has already prevailed through fatigue.

A second practice is to recover intentionality before opening an application. Formulating a purpose - such as "reply to two messages" or "find three sources on a concept" - creates an exit criterion. Timers may help, provided they do not become just another alert. A systematic review and meta-analysis of digital self-control tools estimated a small-to-moderate effect in reducing time spent on technological sources regarded as distracting. The authors note that available evaluations are almost always short-term and frequently lack a control group and subsequent follow-up, which reduces confidence in the reported effects and leaves maintenance of behavior unresolved (Monge Roffarello & De Russis, 2023). Disabling autoplay and limiting recommendations after a defined period restore friction but do not replace institutional change. Sleep-related agreements on charging times and locations should account for work, safety, and family needs while avoiding moralization.

Protecting memory requires alternating consumption with production. After reading or watching, users can close the source, write what they remember, formulate a question, and record the provenance. Retrieval attempts expose gaps that familiarity conceals and strengthen retention (Roediger & Karpicke, 2006). Notes should contain relationships, not merely copied excerpts: why the information matters, what it opposes, which evidence supports it, and what remains uncertain. Digital tools are valuable when they extend this system, not when they accumulate fragments that are never revisited.

At the pedagogical level, schools can institute protected periods for reading and problem solving, supported by collective expectations of unavailability. Law No. 15,100/2025 provides a basis for restricting devices, but the rule must be translated into pedagogical routine (Brazil, 2025a). A phone-free period should provide a positive experience of shared attention, not merely surveillance. Teachers also need institutional support so that they do not individually compete with platforms and can decide when a device adds value.

Digital activities should be evaluated according to their cognitive demands. Instead of asking whether a lesson "uses technology," educators should ask whether students compare, explain, create, retrieve, and revise. A short video may introduce a phenomenon, followed by long-form reading and the construction of an argument map. A networked discussion may generate hypotheses that are subsequently compared with data. A misinformation exercise may ask students to trace origins, open lateral tabs, and calibrate confidence. Media literacy should be integrated into the curriculum rather than introduced only after crises.

Assessment also signals the value assigned to depth. If examinations reward recognition of terms and immediate responses, schools reproduce the regime they criticize. Questions that require justification, connection, and revision make elaboration functional. Portfolios can document changes in position and source quality. Closed-resource moments assess internal knowledge; open-resource moments assess searching and judgment. Separating these competencies prevents memory from being confused with access and makes it possible to teach both.

School and public libraries are infrastructures of attention. They provide collections, curation, quiet, mediation, and encounter. In unequal contexts, spaces for sustained study are cognitive policies as important as connectivity. Accessible digital versions, loans of suitable devices, and free data may coexist with interruption-free environments. UNESCO's recommendation that technology be subordinated to educational needs reinforces that innovation is not measured by the number of platforms purchased (UNESCO, 2023).

At the structural level, platforms should assume responsibilities proportionate to their capacity to shape exposure. Protective defaults for minors may include fewer notifications, no nighttime autoplay, clear limits on personalization, and understandable controls. An experiment with 30 participants compared an interface that required users to react to each post before accessing the next with an infinite-scrolling interface. Those who used the higher-friction version recognized post content more accurately, although most reported frustration with the additional requirement (Ruiz et al., 2024). The study was exploratory and used content recognition as an indicator of less reflective scrolling rather than scrolling duration itself; the trade-off between awareness and satisfaction therefore requires testing at scale. Users need explanations of recommendation, a genuine option to choose chronological or other ordering modes, and tools to export data and preferences. Transparency cannot be reduced to aggregate reports; independent researchers require secure data access to assess exposure and effects.

Success metrics must also change. A platform that optimizes only time spent has limited incentive to preserve user attention. Audits may assess patterns of compulsive use, distribution of harmful content, and effectiveness of controls. Risk-assessment and age-appropriate-design obligations aligned with the Digital

Statute for Children and Adolescents shift the issue from individual blame to duties of prevention (Brazil, 2025b). Regulation should preserve expression and innovation while recognizing that freedom of choice loses substance when interfaces conceal alternatives and exploit asymmetries.

Public policy must support independent and current research. The speed of platform change makes broad categories such as "screen time" insufficient. Studies should record the functions used, content, timing, switching, motivation, vulnerability, and displaced activity. Short-term experiments must be combined with longitudinal data and behavioral measures without sacrificing privacy. Results should be stratified to identify who benefits and who is exposed to risk, thereby avoiding policies based solely on averages.

Shared responsibility, however, must not dilute accountability. Stating that families, schools, governments, and companies participate does not mean that they possess equal power. Platforms have data, optimization teams, and the capacity to alter defaults for millions of people. Public institutions define rights and collective conditions. Schools organize educational time. Users make choices, but within these architectures. A just policy assigns duties according to power and capacity for prevention.

Rebuilding depth also means rebuilding a culture that accepts delay. It means legitimizing answers that come after reading, unrecorded conversations, classes in which not every minute produces visible evidence, and texts that resist summary. This does not entail rejecting speed, which is essential in emergencies and coordination, but preventing it from becoming a universal criterion. Critical thinking needs a practical right to pause: time not to react, to remember before searching, and to sustain a question beyond the engagement cycle.

X. FINAL CONSIDERATIONS

The question of social media and intellectual impoverishment does not admit a binary answer. The corpus does not support the claim that use alone causes a homogeneous and permanent decline in intelligence, attention, or memory. Platforms, formats, practices, and users differ; many average effects are small; some studies are correlational; and reverse causality remains plausible. Social media may also promote learning, authorship, support, and participation.

The absence of universal harm, however, does not make the environment neutral. Retention-oriented models favor designs that reduce stopping points and multiply opportunities for switching. Evidence is strong for acute costs of interruption, repetition, and shallow encoding under specific conditions; evidence is moderate for some associations involving screen reading, short-form videos, and problematic use; and the transition from these effects to general and enduring cognitive change remains weakly supported.

The most defensible thesis is conditional. Social media may create conditions conducive to intellectual impoverishment when intensive, fragmented, compulsive, and passive use intersects with architectures of recurrence and displaces elaborative practices. Impoverishment denotes a lower frequency of sustained attention, deep reading, autonomous retrieval, source comparison, and belief revision. "Shallow memory," the analytical concept proposed in this article, refers to weak encoding and lost provenance, not to a generation incapable of remembering.

Responses must address the different levels of the problem. Individuals can reduce interruptions and alternate access with retrieval; schools can protect periods of attention, teach digital reading, and provide mediation; platforms and public authorities must ensure protective defaults, genuine choices, transparency, and secure researcher access. Laws No. 15,100/2025 and No. 15,211/2025, both currently in force, provide a Brazilian normative basis for this shared responsibility, but their effects will depend on implementation, evaluation, and social participation that have not yet been documented in impact studies.

The limitations of the literature remain central: broad categories, self-reports, limited platform transparency, brief experiments, and a scarcity of trajectories from the Global South. These are compounded by the limitations of the present study, which was conducted by a single reviewer without a registered protocol or formal risk-of-bias assessment. Future research should compare specific features, integrate behavioral and qualitative data, track effects over time, and preserve privacy. Preserving deep thinking does not require a past without social media, but a present in which connection can become knowledge without dissolving the conditions of autonomy: attention that endures, memory that relates, and judgment capable of sustaining the words "I do not yet know."

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