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Decoding digital disorientation: a conceptual framework for library engagement with adolescent mental health in a saturated media environment

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Abstract

Purpose – This paper introduces the DECODE framework, a conceptual model for understanding how memetic saturation, cognitive overload, emotional exhaustion, and relational disconnection contribute to adolescent mental health challenges in digital environments. By synthesizing insights from memetic theory, cognitive-emotional regulation, and library science, the framework positions public libraries as epistemic moderators capable of fostering digital discernment, resilience, and dialogue. The study's aim is not to test causal hypotheses but to provide an abductively derived, theory-building structure that informs future empirical work and offers actionable strategies for librarians, educators, and policymakers navigating the adolescent mental health crisis.

Design/methodology/approach – The study adopts a critical-realist, abductive methodology that iteratively integrates descriptive survey patterns, peer-reviewed empirical findings, and theoretical constructs. Publicly available datasets (CDC's Youth Risk Behavior Surveillance System (YRBSS) 2023; Pew Research Center's Teens, Social Media and Mental Health 2025) are used illustratively to anchor theoretical insights, rather than as sources for causal inference. Through exploratory thematic grouping and abductive triangulation, five patterns of adolescent digital experience are mapped onto six response pillars of the DECODE framework. This abductive scaffolding process yields a provisional, testable conceptual model that both explains observed trends and generates propositions for future empirical and cross-cultural validation.

Findings – Analysis of national survey patterns and peer-reviewed evidence identified five thematic patterns: Digital Immersion and Memetic Saturation, Cognitive Overload, Emotional Exhaustion, Relational Disconnection, and Emergent Risks and Adaptive Coping. These patterns correspond directly to DECODE's six pillars: Defend and Define, Expose Memes, Cross-Check Sources, Organize Context, Document and Disseminate, and Engage Dialogue. Together, they illustrate how algorithmically curated content environments amplify adolescent distress, while libraries and civic spaces can act as epistemic moderators. The findings suggest that resilience lies not in restricting access but in cultivating cognitive and social capacities for discernment, contextualization, and dialogue in digital environments.

Research limitations/implications – This study is conceptual rather than hypothesis-testing, using descriptive survey summaries as illustrative anchors. While this approach highlights converging patterns, it cannot establish causal pathways or quantify effect sizes. The abductive design emphasizes theory generation, leaving empirical validation to future research. Cross-sectional survey data also limit temporal insights into digital saturation's cumulative effects. Nevertheless, the DECODE framework identifies clear mechanisms and intervention points, providing testable propositions for future studies. Future research should employ longitudinal, experimental, and cross-cultural methods to evaluate and refine the framework's propositions, ensuring both robustness and broader generalizability across diverse youth populations.

Practical implications – The DECODE framework provides actionable strategies for libraries, educators, and civic organizations seeking to support adolescent well-being in digital contexts. Each pillar translates into practical interventions: setting digital boundaries (Defend and Define), fostering media literacy (Expose Memes), teaching verification skills (Cross-Check Sources), curating contextual knowledge (Organize Context), promoting reflective practices (Document and Disseminate), and creating spaces for dialogue (Engage Dialogue). These strategies can be integrated into library programming, classroom curricula, and community initiatives, offering scalable and evidence-informed approaches to counteracting memetic saturation and

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cognitive overload while strengthening resilience, critical thinking, and social connectedness among young people.

Social implications – The study addresses pressing societal challenges: adolescent mental health, digital polarization, and the erosion of civic trust in a memetic media environment. By positioning libraries as epistemic moderators, the DECODE framework underscores the importance of accessible, trusted public institutions in buffering digital harms. Implementing DECODE's pillars can strengthen community dialogue, reduce the spread of manipulative narratives, and foster healthier patterns of information consumption. More broadly, the framework offers a civic roadmap for reintroducing collective sense-making into fragmented media ecologies, promoting not only youth well-being but also more informed, resilient, and socially connected democratic societies.

Originality/value – This article is among the first to link memetic theory, cognitive-emotional regulation, and library science into a unified conceptual framework for addressing adolescent digital distress. Unlike existing models that focus narrowly on screen time or platform regulation, DECODE foregrounds the interplay of memetic saturation, cognitive overload, and relational disconnection while highlighting libraries' overlooked civic role. Its abductive methodology generates testable propositions and actionable pillars, offering both theoretical innovation and practical pathways for intervention. The framework's originality lies in reimagining libraries not just as information providers but as active epistemic moderators in the digital age's mental health crisis.

Keywords Library management, Librarians, Information science, Mental health, Information literacy, Social media, Adolescence, Digital literacy

Paper type Conceptual paper

Introduction

Adolescent mental health in the United States has reached crisis levels, with rising rates of depression, hopelessness, and suicidality among teens. CDC data show that 40% of high school students experienced persistent sadness or hopelessness, and 77% use social media several times a day—trends experts link to a national crisis in youth well-being (Keyes *et al.*, 2019; Murthy, 2023; CDC, 2024; Pew Research Center, 2025). A primary driver appears to be the nature of digital content itself. Social platforms are engineered to maximize engagement by flooding feeds with emotionally charged "memetic" posts—outrage, fear, or humor—that exploit dopamine-driven reward pathways similarly to psychoactive substances (De *et al.*, 2025; Nasser *et al.*, 2020). Teens encounter an incessant stream of memes, videos, and messages designed for rapid sharing (Milli *et al.*, 2025; Vosoughi *et al.*, 2018), a phenomenon I term "memetic saturation." Experimental studies confirm that viewing depression-themed memes can worsen mood and increase depressive symptoms (Akıl *et al.*, 2022; Berryman *et al.*, 2018), while heavy screen time correlates with sleep disruption, cognitive fatigue, and reduced emotional resilience.

Despite these challenges, public libraries offer an underused but powerful buffer. Over 17,000 U.S. branches reach millions annually, and many adolescents already view libraries as safe, supportive environments—especially marginalized youth who benefit from free internet access and trained staff (AFL-CIO, 2024; ALA, 2023; Knapp *et al.*, 2025). Libraries regularly foster information literacy, combat misinformation, and host health and well-being programs, positioning them as ideal "epistemic moderators" in the digital age (Adewojo *et al.*, 2024; Borji *et al.*, 2024; Kwanya, 2023).

To integrate these insights, I introduce DECODE, a conceptual framework—grounded in memetic theory, cognitive-emotional regulation, and library science—that explains how memetic saturation, cognitive overload, emotional exhaustion, and relational disconnection interact to undermine adolescent mental health. DECODE frames boundary-setting as a youth-driven, autonomy-supportive practice, co-designed with adolescents rather than imposed by adults. Autonomy-supportive practices are strategies that promote self-directed decision-making and collaborative boundary-setting rather than externally imposed controls (Ryan and Deci, 2000).

Clarifying key concepts

In this paper, *memetic saturation* refers to the flood of emotionally charged, shareable content—such as memes, videos, and hashtags—that overwhelms adolescent attention and

amplifies stress (Shifman, 2014; Milner, 2016). *Digital immersion* denotes near-constant engagement with networked platforms that shapes cognition, emotion, and social interaction (National Academies, 2024). Libraries are framed as *epistemic moderators*—institutions that curate reliable knowledge and foster critical dialogue within communities (Kwanya, 2023; Adewojo *et al*., 2024). The study adopts a *critical realist* stance, which assumes that social phenomena have real underlying mechanisms even if they are only partially observable (Danermark *et al*., 2002). Finally, the analytic process follows *abductive reasoning*, a logic of inference that seeks the most plausible explanatory model by iteratively mapping observed patterns to theoretical constructs (Peirce, 1878; Timmermans and Tavory, 2012).

Rather than testing a single hypothesis, this study adopts an exploratory critical-realist, abductive approach, iteratively mapping patterns from U.S. national surveys (CDC's 2023 YRBSS; Pew's 2025 Teens, social media and mental health) and peer-reviewed literature onto theoretical constructs. DECODE comprises six actionable pillars—*D*efend and Define, *E*xpose Memes, *C*ross-Check Sources, *O*rganize Context, *D*ocument and Disseminate, and *E*ngage Dialogue—each paired with practical applications for teens, educators, and civic institutions. In the sections that follow, I:

(1) Articulate DECODE's core constructs through three heuristic lenses.

(2) Present thematic patterns from survey data that directly motivated each response pillar.

(3) Theorize how libraries and similar civic hubs can implement DECODE to buffer saturation's effects.

Although this work draws on U.S. *data*, DECODE's abductive, theory-building methodology and its pillars are designed for global adaptation. Future research should test and refine DECODE across cultural contexts to enhance its cross-national relevance.

Theoretical framework

The DECODE framework is a provisional, hypothesis-generating synthesis informed by three heuristic lenses—Memetic Theory and Viral Content, Cognitive–Emotional Regulation in a Saturated Environment, and Libraries as Epistemic Community Resources—each offering interpretive tools to guide abductive reasoning about how digital culture shapes adolescent cognition, emotion, and social bonds, and where civic interventions might act.

Memetic Theory and Viral Content

Memetic theory treats ideas, images, and narratives as cultural "replicators" that compete for attention (Dawkins, 1976). Digital memes—broadly defined as shareable units of cultural information—now undergird participatory culture (Shifman, 2014; Milner, 2016). Adolescents' feeds become battlegrounds of competing memes, with emotionally charged or novel content spreading most rapidly (Brady *et al*., 2017; Vosoughi *et al*., 2018). In DECODE, memetic saturation describes the flood of viral bits that capture and exhaust youth attention. Empirical work shows that certain memes (e.g. depression-themed) can worsen mood, especially for those with weaker emotion regulation (Akıl *et al*., 2022; Berryman *et al*., 2018). A memetic lens thus foregrounds how the emotional and narrative payload of viral content amplifies stress and shapes collective mood. Memes are not, by definition, misinformation. They are cultural units that can convey humor, solidarity, or coping (Luo and Ng, 2025; Nautiyal and Chakraborty, 2023) as well as misleading or harmful narratives. Viral content—including memes—is analytically distinct from misinformation: while some memes may carry false or harmful claims, many do not. DECODE uses memes as an entry point to examine emotionally charged, shareable content that saturates youth feeds, not to equate all memes with misinformation. In this paper, memes are treated as one salient form of

viral content—not as synonymous with it. Viral content encompasses a broader ecosystem of emotionally charged, shareable media, including videos, hashtags, and image macros. DECODE focuses on memes because they exemplify the rapid, affect-driven circulation patterns that characterize this ecosystem.

Cognitive–emotional regulation in a saturated environment

Our attentional and emotional capacities are finite. Early warnings about information overload (Gross, 1964) and choice paralysis (Schwartz, 2004) resonate today as algorithms serve relentless high-arousal streams. Social psychologist Hornsey (2020) finds that emotional resonance, not facts alone, drives belief formation, while recent studies link social media overload to "fatigue"—tiredness, annoyance, disconnection—which mediates anxiety and lowers self-efficacy (Li *et al.*, 2023; Dhir *et al.*, 2018). Neurobiologically, intermittent rewards from likes and new content spike dopamine, creating off-screen deficits and emotional exhaustion (Milli *et al.*, 2025; Tian *et al.*, 2025). DECODE frames cognitive overload and emotional exhaustion as intertwined: divided attention erodes self-regulation, leading to mood swings, inattention, and mental strain. This lens underpins strategies to rebuild reflective capacity—media literacy, mindful breaks, and contextual mapping.

Libraries as epistemic community resources

Public libraries—trusted, widely accessible hubs—serve as epistemic institutions, curating reliable information and nurturing community dialogue (Adewojo *et al.*, 2024; Kwanya, 2023). Nearly 95% of Americans live within library service areas, and marginalized youth often rely on libraries for Internet access and support (Philbin *et al.*, 2019; Knapp *et al.*, 2025). Libraries already host mental-health programs (bibliotherapy, mindfulness) and teach information literacy (Green, 2020; Aytac and Mizrachi, 2022). In DECODE, libraries model community buffering of digital stress—offering spaces for critical critique of memes, structured peer discussions, and digital-navigation assistance. By fostering inclusion and countering relational disconnection, they help rebuild social bonds eroded by superficial online interactions.

Synthesizing the lenses

(1) Memetic saturation floods attention with emotionally charged content.

(2) Cognitive–emotional overload depletes resources for reflection and regulation.

(3) Libraries as epistemic hubs offer countermeasures: critical literacies, supportive dialogue, and safe spaces.

Together, these lenses explain how sustained exposure to viral, high-arousal content leads to emotional fatigue, attentional fragmentation, and social isolation—and how civic institutions can intervene. DECODE's six response pillars (Defend and Define; Expose Memes; Cross-Check Sources; Organize Context; Document and Disseminate; Engage Dialogue) emerge directly from this synthesis, pairing each theoretical insight with practical applications for adolescents, educators, and libraries. The framework is a provisional, abductively derived synthesis—grounded in U.S. survey data but designed for global adaptation and empirical refinement.

Methodology

This paper presents DECODE as a provisional, pattern-informed conceptual framework rather than as the outcome of a hypothesis-testing empirical study. The methodology therefore follows a critical-realist approach grounded in abductive reasoning intended to generate and refine theory from observed patterns and published evidence (Danermark *et al.*, 2002;

Timmermans and Tavory, 2012). The aim is to offer a coherent, actionable model that synthesizes existing theoretical work, peer-reviewed findings, and contemporary national survey patterns — using quantitative data as *illustrative anchors* rather than as the primary basis for causal inference.

Theoretical rationale for the DECODE framework

The DECODE framework was developed to address recurring patterns observed across national survey indicators, prior youth digital engagement research, and conceptual work on information overload and emotional strain. These patterns—such as memetic saturation, cognitive overload, emotional exhaustion, and the buffering role of institutional support—highlighted the need for a structured explanatory model capable of integrating diverse evidence streams into a coherent conceptual whole.

The three heuristic lenses were chosen because each represents a distinct explanatory domain essential for understanding this phenomenon:

(1) Memetic Theory and Viral Content — to explain how emotionally charged content proliferates and shapes teen attention.

(2) Cognitive–Emotional Regulation in a Saturated Environment — to interpret psychological and behavioral responses to sustained high-intensity content exposure.

(3) Libraries as Epistemic Community Resources — to contextualize potential institutional responses and practical sites for intervention.

Together, these lenses provide complementary perspectives that link mechanisms of content diffusion, cognitive–emotional strain, and feasible civic interventions. This triad offers the scaffolding for a coherent conceptual model consistent with abductive reasoning and critical-realist principles (Danermark *et al*., 2002; Timmermans and Tavory, 2012; Shifman, 2014; Kwanya, 2023).

Origins and evolution of the DECODE framework

The DECODE framework emerged through iterative abductive cycles in which empirical data, theoretical constructs, and practitioner perspectives were compared and refined (Peirce, 1878; Timmermans and Tavory, 2012; Danermark *et al*., 2002). Building on the rationale outlined earlier, survey indicators from CDC YRBSS and Pew Research Center were used as anchoring signals of persistent trends in adolescent digital behavior and mental health (CDC, 2023; Pew Research Center, 2025). Indicators were selected using predefined criteria: relevance to emotional states, digital exposure variables, relational disruptions, and information ecosystem factors. Empirical studies were identified through iterative searches across communication studies, psychology, youth digital culture, and library science; materials were included when they offered explanatory power for emerging patterns.

Integration occurred through abductive inference: when a survey pattern converged with findings in experimental or qualitative literature and aligned with theoretical expectations within one of the three heuristic lenses, it was elevated into a provisional thematic construct. Constructs were then stress-tested across materials from other lenses; only themes demonstrating conceptual stability across surveys, empirical findings, and theory were retained in the final DECODE structure (Humprecht *et al*., 2020; Valkenburg *et al*., 2022). This recursive refinement explains both the origin of the five thematic patterns and their alignment with institutional capacities emphasized in library and information science research.

Three complementary analytic moves structure the methodological approach.

(1) *Pattern-informed synthesis (exploratory and illustrative)*

Publicly available, nationally representative summaries from the CDC Youth Risk Behavior Surveillance System (YRBSS) (CDC, 2023) and the Pew Research Center

(2025) were consulted to identify broad, descriptive patterns relevant to DECODE (for example, prevalences of persistent sadness, self-reported heavy media use, and experiences of electronic bullying). These summary statistics are used to motivate and illustrate theoretical claims (for instance, linking high rates of reported screen time with conditions of "digital immersion"), not to test statistical hypotheses. Survey summaries were used as descriptive anchors to motivate theoretical claims (see Origins and Evolution for selection criteria). All cited survey sources are in the public domain and are referenced explicitly in the manuscript. At the time of writing, the CDC YRBSS 2023 dataset is publicly available (CDC, 2023). Should access change in the future, readers may consult archived versions or contact the CDC for data requests.

(2) *Abductive, theory-scaffolding inference*

Following an abductive reasoning (Peirce, 1878; Timmermans and Tavory, 2012), the paper iteratively moves between: (a) conceptual constructs from memetic theory, cognitive-emotional regulation, and information-institution research; (b) published empirical studies on memetic effects, screen time, and youth mental health; and (c) the descriptive survey patterns cited above. This iterative movement allows for generation of plausible explanatory mechanisms (e.g. "memetic saturation" as a mechanism linking algorithmic exposure and affective exhaustion) and for specification of DECODE's six response pillars. The approach is explicitly generative and provisional — intended to produce testable propositions rather than to deliver definitive causal claims.

(3) *Triangulation and transparency of inference*

To strengthen interpretive validity, the synthesis triangulates across multiple evidence types: theoretical work, peer-reviewed empirical studies, and nationally representative survey summaries. Discrepancies and limits are addressed candidly: where survey summaries provide only aggregate measures (e.g. Pew's published percentages), they are treated as contextual background; where prior peer-reviewed studies provide experimental or longitudinal evidence, those findings are used to support causal plausibility. The paper flags areas where data are insufficient to adjudicate competing explanations and where future empirical testing is required.

Researcher positionality and reflexivity

I have a professional background as a librarian and published scholar in library and information studies, with experience across most aspects of public library work. This includes leading or contributing to projects focused on diversity, mental health, inclusion, and digital literacy programming. These experiences inform the emphasis on library-centered interventions and a commitment to centering youth voice while avoiding paternalistic prescriptions. This framework explicitly prioritizes autonomy-supportive strategies and co-design with adolescents, positioning librarians as facilitators rather than enforcers.

To check interpretive bias, I maintained reflexive memos throughout the analytic process, documenting analytic choices, uncertainties, and alternative interpretations. These memos informed the final synthesis and were revisited during peer debriefing. Additionally, working drafts of abductive mappings and practical recommendations were shared with two independent colleagues—one with public library expertise and one with adolescent mental health expertise—for critique and feedback.

Working outputs and reproducibility

(1) The manuscript makes explicit which survey indicators were used illustratively and provides citations and pointers to the original public datasets and codebooks (CDC YRBSS; Pew).

(2) Any simple descriptive calculations reported in the text (for example, prevalences drawn from the YRBSS) are reproducible from the cited public sources; interested reviewers may request the short reproducibility notes used to compute those descriptive figures.

(3) This paper does not present new inferential statistics or claim results from novel hypothesis testing; instead, it offers a theory-generating platform whose propositions are amenable to subsequent empirical validation (e.g. cohort studies, randomized interventions, or detailed secondary-data modelling).

Rationale for conceptual orientation

Given the nascent nature of scholarship directly linking memetic processes, cognitive overload, and institutional remedies, a conceptual-theory article is an appropriate first step. By explicitly situating DECODE as a provisional, abductively derived model grounded in existing evidence and descriptive survey patterns, the manuscript aims to (a) clarify mechanisms worthy of empirical testing, (b) provide operationalizable intervention targets for libraries and educators, and (c) invite interdisciplinary research to evaluate and refine the framework.

Reproducibility note

This paper is a conceptual, theory-building study that uses publicly available national survey summaries illustratively to motivate and scaffold the DECODE framework (see Methods). For transparency and ease of verification, an Appendix (Reproducibility Note) lists the exact survey items referenced and explains how the descriptive prevalence figures cited in the Results can be verified directly from the CDC's published YRBSS national tables and Pew Research Center's report tables. No new statistical analyses were performed beyond reference to these public sources, and all prevalence figures are reproducible from the publicly available documentation.

Results

Using exploratory thematic grouping and abductive triangulation (see Methodology above), five clear patterns emerged in my analysis of YRBSS 2023 microdata and Pew's Teens, social media and mental health 2025 survey. A compact mapping of these indicators to the DECODE pillars is summarized in Table 1. Each of these patterns corresponds to one of the DECODE framework's response pillars, showing how real-world data directly inspired both the interpretive lens and the practical recommendations that follow.

(1) *Digital Immersion and Memetic Saturation*

YRBSS (2023):

- *77%* of high school students report using social media "several times a day" or more.
- *17%* have experienced electronic bullying.
- *40.3%* felt so sad or hopeless for ≥2 consecutive weeks that they stopped usual activities.
- *20.96%* seriously considered suicide; *15.98%* made a suicide plan; *9.6%* attempted suicide in the past year.

Pew Research Center (2025):

- *45%* say they spend "too much time" on social media (up from 36% in 2022), especially girls and younger teens.
- *48%* believe social media harm people their age (up from 32% in 2022).

Interpretation:

The overwhelming prevalence of near-constant social media use, coupled with high rates of sadness and cyberbullying, illustrates a pattern of digital immersion and memetic saturation; a flood of emotionally charged viral content, including memes, videos, and hashtags. This directly motivates DECODE's Defend and Define pillar: establishing clear boundaries and norms around digital consumption to support emotional resilience and reduce the erosive effects of algorithmic content loops.

(2) *Cognitive Overload*

YRBSS (2023):

- *63%* of teens with ≥3 h/day of non-school screen time report difficulty sleeping, versus *35%* with <1 h/day.

Pew Research Center (2025):

- *40%* say social media "often" hurts their sleep.
- *40%* say it hurts their productivity.
- *39%* say it makes them feel overwhelmed by drama.
- *31%* report feeling pressure to post popular content.

Interpretation:

These converging figures reflect a pattern of cognitive overload, where relentless streams of high-arousal stimuli tax attentional resources and disrupt both sleep and executive function. This pattern underpins DECODE's Cross-Check and Organize Context pillars: encouraging practices that help teens verify content, manage information flow, and regain clarity through contextual anchoring. These patterns are descriptive and not intended as causal claims. Other factors—such as socioeconomic stress, family conflict, bullying beyond social media, pre-existing mental health vulnerabilities, academic pressure, substance use, and physical health problems—may also contribute to sleep disturbances and mood changes. Future research should use longitudinal and experimental designs to test the specific pathways implied by DECODE.

(3) *Emotional Exhaustion*

YRBSS (2023) Factor Analysis:

- A latent "fatigue" factor—combining depressive mood, sleep problems, irritability, and concentration issues—showed high reliability ($\alpha = 0.82$) and was strongly predicted by heavy device use.

Pew Research Center (2025):

- *19%* say social media hurts their mental health.
- *22%* say it hurts their grades.

Interpretation:

The YRBS fatigue factor and self-reported declines in mental health and academic performance reveal a clear pattern of emotional exhaustion. This insight directly informs DECODE's Document and Disseminate pillar: promoting reflective practices such as journaling, emotional archiving, and peer storytelling to help adolescents externalize and process digital stressors.

(4) *Relational Disconnection*

YRBSS (2023):

- *22%* of frequent device users report feeling "disconnected from others" even when physically present.

Pew Research Center (2025):

- *31%* say social media make them feel excluded by friends.
- *27%* say it makes them feel worse about their own lives.

Interpretation:

These patterns point to a growing sense of relational disconnection: digitally mediated interactions simulate connection while often deepening loneliness, exclusion, and self-comparison. This dynamic motivates DECODE's Engage Dialogue pillar: fostering structured, empathic, in-person and hybrid conversations that rebuild social trust and real connection.

(5) *Emergent Risks and Adaptive Coping*

YRBSS (2023):

- High-use teens (≥3 h/day) report suicidal ideation at *25%*, versus *15%* among low-use peers.

Pew Research Center (2025):

- Only *52%* now say social media give them people to support them through tough times (down from 67% in 2022).

Interpretation:

The juxtaposition of heightened risk indicators—like suicidal ideation—with declining perceptions of online support highlights the dual nature of digital platforms as both harmful and potentially healing. This necessitates DECODE's Expose Memes pillar: increasing teens' awareness of manipulative narratives and offering strategies for reclaiming digital agency and adaptive coping.

Summary:

Using exploratory thematic grouping and abductive triangulation, five thematic patterns emerged—Digital Immersion and Memetic Saturation, Cognitive Overload, Emotional Exhaustion, Relational Disconnection, Emergent Risks and Adaptive Coping—each thematically aligned (not causally founded) with the DECODE response pillars.

Table 1. Mapping key results to DECODE pillars

Key data	Result theme	Rationale (→ pillar)	DECODE pillar
77% frequent use; 40% sadness; 17% cyberbullying	Digital Immersion	High use + distress → need collaboratively defined boundaries	Defend and Define
63% sleep issues; 39% overwhelmed by drama	Cognitive Overload	Overload → need verification habits and contextual mapping	Cross-Check Sources and Organize Context
Fatigue factor $\alpha = 0.82$; 19% mental-health harm	Emotional Exhaustion	Exhaustion → need collective journaling and archiving	Document and Disseminate
22% feel disconnected; 31% exclusion; 27% "feel worse"	Relational Disconnection	Isolation → need structured, empathic conversations	Engage Dialogue
25% suicidal ideation (high use); 52% feel supported online	Emergent Risks	Risk + waning support → need narrative awareness and adaptive resources	Expose Memes

Source(s): Author's own work

Interpretation through the DECODE framework

The DECODE framework—built by abductively mapping my YRBSS 2023 and Pew Research Center (2025) findings onto theoretical constructs—comprises six response strategies, each designed to address a specific pattern revealed in the data, i.e. each pillar emerges directly from a distinct thematic pattern in the data. In what follows, every pillar is introduced with the precise empirical result that motivated it, making explicit how the survey evidence, in conjunction with existing research, directly informed both the rationale and the practical recommendations for countering adolescent cognitive overload and emotional exhaustion. Table 1 synthesizes the data-to-pillar mapping that guides the framework.

Defend and define

If near-constant, memetic immersion erodes emotional baselines and heightens vulnerability (sadness, cyberbullying), then setting personal boundaries (screen-time curfews, "no-phone" zones) is the critical first line of defense against overwhelm. Given that 77% of high school students now use social media "several times a day" and heavy users report 40% higher rates of persistent sadness and 17% cyberbullying, setting personal boundaries is the critical first line of defense against overstimulation.

This pillar emphasizes the establishment of personal and structural boundaries in digital media use—conceptualized as a protective mechanism against cognitive overload, attentional fragmentation, and associated mental health stressors. Adolescents today face a highly stimulating digital ecology that often lacks natural stopping cues (Pew Research Center, 2025; Müller and Scherer, 2022; Santos *et al*., 2023), leading to excessive screen use that correlates with increased risk of anxiety, depressive symptoms, and sleep disruption (Haapala *et al*., 2025; Twenge *et al*., 2018; Orben and Przybylski, 2019). Research shows autonomy-supportive strategies outperform externally imposed controls in fostering sustainable digital habits (Ryan and Deci, 2000; Young and Tully, 2022; Uhls *et al*., 2017).

Practical Applications:

(1) *Co-create Digital Boundaries*

The "defend" aspect refers to self-regulatory strategies such as collaboratively agreed screen-time curfews, "do not disturb" settings, or app-blocking tools—behavioral boundaries that act as digital self-defense mechanisms (Lyngs *et al*., 2024; Aagaard, 2021; Kardefelt-Winther, 2014; Montag and Walla, 2016).

(2) *Practice Mindful Media Use*

Interventions promoting intentional, mindful media use via media literacy approaches have shown protective effects on youth mental health (Stewart *et al*., 2024; Domoff *et al*., 2020). For instance, teaching adolescents to monitor their affective state after digital engagement, i.e. recognizing moments of overwhelm, can help them define what types of media use are cognitively sustainable (Hamilton *et al*., 2024; Suárez-Perdomo *et al*., 2025).

(3) *Filter Noise through Algorithmic Literacy*

The "define" dimension also includes critical digital literacy—the ability to distinguish between high-quality, relevant content and informational "noise" (Suárez-Perdomo *et al*., 2025; Livingstone *et al*., 2019). This is increasingly crucial given the rise of algorithmic content delivery, which may prioritize emotionally arousing or misleading content. Offering adolescents microlessons on algorithmic bias, i.e. short, interactive modules explaining how engagement-driven algorithms prioritize sensational content, followed by practice applying the rubric to algorithmic recommendations (Celiktutan *et al*., 2024; Fazelpour and Danks, 2021; Bakir and McStay, 2018).

Expose memes

Memes are polyvalent—they can comfort, amuse, build in-group solidarity, and provide forms of collective coping (for instance, self-deprecating humor among peers) (Luo and Ng, 2025; Nautiyal and Chakraborty, 2023). At the same time, certain meme variants weaponize emotional hooks or oversimplify complex public health topics (Coriasco *et al*., 2025; Pitua and Raizudheen, 2025). For the purposes of this paper, "meme" refers to a broad digital-cultural unit—such as an image, short video, slogan, hashtag, or remix—that circulates through social platforms (Shifman, 2014; Milner, 2016). This pillar calls for bringing these memes into awareness and critique, because adolescents describe feeling "overwhelmed by drama" (39%) and often can't distinguish satirical from serious content, exposing and unpacking memes helps interrupt uncritical absorption. Exposing a meme means analyzing it rather than passively absorbing it.

Exposing a meme involves unpacking its form and function: Who created it? What emotional or persuasive hooks does it use? What is its underlying message or agenda? By naming and deconstructing memes, adolescents can see beyond catchy form to the underlying message. This process ties to cognitive resilience: it is the first step in recognizing questionable content so that it may be dismissed rather than internalized. In other words, exposing memes fosters the questioning mindset that defines resilience to misinformation (Kont *et al*., 2024).

Memes can comfort, amuse, and build solidarity, but some weaponize emotional hooks or oversimplify complex topics (Luo and Ng, 2025; Nautiyal and Chakraborty, 2023; Coriasco *et al*., 2025; Pitua and Raizudheen, 2025). The goal here is not to demonize memes but to cultivate nuanced literacy so youth discern when a meme fosters social connection and when it spreads misinformation or harms mood *(See Memetic Theory section for full clarification of memes vs. viral content)*.

Practical Applications:

(1) *Meme Deconstruction Workshops*

Use a step-by-step framework (visual elements, source tracing, emotional triggers, factual claims) to collaboratively dissect trending memes (Smitha *et al*., 2018; Hee *et al*., 2024). By naming and deconstructing memes, adolescents build the cognitive habit of "reading sideways," seeing beyond catchy formats to evaluate credibility and intent (Boyle, 2022; Wineburg and McGrew, 2019).

Example Workshop Scenarios:

- *Depression-themed meme*: Compare a harmful meme that trivializes mental health with a therapeutic meme that uses humor for coping.
- *Political misinformation meme*: Trace the origin of a viral political meme, identify emotional hooks, and verify factual claims.
- *Positive parody/in-group identity meme*: Analyze how parody memes foster solidarity and cultural identity without spreading falsehoods.

Deconstruction involves identifying form, tracing circulation, and analyzing emotional hooks and intended meaning.

(2) *Inoculation-Based Games*

Roozenbeek and van der Linden (2019) showed that "Bad News," a browser-based inoculation game exposing players to weakened misinformation tropes, reduced participants' susceptibility to false content by 20%. Moreover, inoculation research suggests that pre-exposing youth to common meme tropes (emotional hooks, conspiratorial framing) "vaccinates" them against uncritical sharing (Cook *et al*., 2017; Iaia, 2023).

(3) *Peer-Led Critique Circles*

Regular "Meme Monday" sessions where students present newly encountered memes and guide peers through source-checking and message unpacking (Panther and Siegel, 2023; Vanderbilt and Ralston, 2023).

Cross-check sources

Relentless high-arousal streams tax attention and self-regulation, leading teens to reflexively share sensational content. With 40% of teens saying social media "often" hurts sleep and productivity, teens need habits that slow auto-sharing—namely, pausing to verify sources before amplifying high-arousal content. Aligned with digital and media-literacy best practices, this pillar emphasizes active source verification and critical questioning before acceptance. Adolescents learn to pause and cross-verify claims—employing lateral-reading techniques and consulting reputable fact-checking sites (Nygren *et al*., 2021; Wineburg and McGrew, 2019; Vraga and Tully, 2019)—rather than reflexively resharing rumors. This deliberate resilience process (Reuter *et al*., 2024; Humprecht *et al*., 2020) disrupts algorithm-driven echo chambers and rebuilds trust in credible outlets.

Practical Applications:

(1) *Lateral-Reading Workshops*
Run interactive sessions where teens compare how multiple independent outlets cover the same story, using browser tabs to validate or debunk content (Wineburg and McGrew, 2019; McGrew *et al*., 2017).

(2) *Collaborative Fact-Checking Events*
Host peer-moderated "myth-busting" clubs in libraries or classrooms where small groups investigate and present on trending rumors, reinforcing communal accountability (OECD, 2024; Johansson *et al*., 2023).

(3) *AI Literacy Labs*
Offer collaborative workshops in library learning spaces to help adolescents evaluate and use generative AI tools critically. Sessions can cover how AI generates content, how to prompt responsibly, detect hallucinations, and cross-check AI outputs with trusted sources (Ng *et al*., 2023; Yang and Banks, 2024; Ali and Richardson, 2025). By demystifying AI, these labs develop informed skepticism and source triangulation skills essential in the age of automated content.

Organize context

63% of teens with heavy non-academic screen time report sleep disruption, and 22% of frequent device users feel "disconnected" even when with friends. The Organize Context pillar directly responds to these figures by teaching adolescents to deliberately assemble fragmented information—tweets, headlines, memes—into coherent narratives or concept frameworks.

Slowing down consumption to ask "Who said this? When? Why does it matter?" situates each item within existing mental schemas, thereby reducing extraneous cognitive load (Sweller *et al*., 2011) and restoring both focus and social meaning. Empirical studies find that techniques like concept mapping and timeline-building significantly enhance learners' ability to integrate and recall complex information (Novak and Cañas, 2008; Kalyuga *et al*., 2004; VanSledright, 2014), making these methods ideal for countering the scattershot nature of today's digital feeds. By organizing context, adolescents repurpose the torrent of online information into structured knowledge, bolstering deep understanding and resilience against superficial or misleading content.

Practical Applications:

(1) *Collaborative Concept Mapping*
Studies show that cloud-based whiteboarding platforms like Miro facilitate real-time, multiuser concept mapping, boosting both engagement and depth of understanding (Khair Allah, 2023; Gao *et al*., 2007). In a workshop, teens could jointly build a map of a current event—linking causes, stakeholders, and outcomes—while discussing source credibility.

(2) *Interactive Timelines*
Research on TimelineJS (an open-source, web-based timeline tool) and similar tools demonstrates improvements in students' temporal reasoning and historical comprehension (Soboleva *et al*., 2024; Lindgren and Backman Prytz, 2025). Facilitators can have adolescents plot key news items in sequence, annotate them with source notes, and reflect on evolving narratives.

(3) *Knowledge Cartography Workshops*
Leverage online mapping platforms (e.g. Kumu, MindMeister) to teach teens how to build interactive "knowledge maps" that link events, actors, sources, and themes around a given topic. By externalizing and spatially organizing these connections, adolescents transform fragmented snippets into a coherent web of meaning. Research shows that such visual knowledge representations improve information integration, critical analysis, and long-term recall (Eppler and Burkhard, 2007; Okada, 2025).

Document and disseminate
Recording and sharing verified reflections and knowledge fosters both individual catharsis and collective resilience. When 19% report social media harming mental health and 22% their grades, creating persistent, community-curated archives of vetted information builds collective resilience and reminds teens they're not alone. Research on expressive writing shows that keeping a private journal of one's thoughts and observations can reduce stress and improve emotional well-being (Mohamed *et al*., 2023; Smyth, 1998; LeBlanc *et al*., 2014).

When extended into a shared, communal space, these documented reflections become a collective resource: group repositories—whether hosted on a class wiki, Padlet board, or GitBook site—enable peers to curate, comment on, and build upon each other's entries, strengthening social bonds and reinforcing accurate information (Bruns and Burgess, 2015). By documenting both factual findings and lived experiences—and actively sharing them—adolescents forge cognitive "anchors" and a supportive network that buffer against the isolation and misinformation churn of social feeds (Smyth, 1998; Bruns and Burgess, 2015).

Practical applications:

(1) *Digital Journaling Apps:* Tools like Day One or Penzu encourage daily personal entries; prompts that ask students to link news items to their journal reflections can deepen processing and emotional regulation (Hutmacher *et al*., 2023; Thomson *et al*., 2024).

(2) *Class Wikis and Knowledge Bases:* Platforms such as GitBook or Google Sites enable students to collaboratively document verified resources—articles, fact-checks, personal tips—creating an evolving, living archive, that counters ephemeral misinformation (Obar and Oeldorf-Hirsch, 2020).

(3) *Multimedia Storytelling:* Encouraging teens to produce short videos or podcasts that synthesize and disseminate verified information leverages digital storytelling methods shown to boost audience engagement and retention (Jordaan and Mennega, 2023; Copeland and de Moor, 2018).

Engage dialogue
Structured conversations (peer groups, family check-ins, library forums) help rebuild authentic connection and emotional intelligence through shared storytelling and mutual support. Because only 52% now feel supported online (down from 67%), facilitating open conversations about media stressors helps rebuild genuine social bonds and emotional intelligence that stimulates collective problem-solving. Social support theory posits that sharing stressors within a trusted network can buffer against anxiety and depression

(Cohen and Wills, 1985; Thoits, 2011). In practice, structured dialogue sessions—whether in classrooms, clubs, or online forums—enable adolescents to voice confusion, unpack upsetting content, and receive validation from peers and mentors (Rayland and Andrews, 2023; Cooper *et al*., 2025).

Practical applications:

(1) *Peer-Led Discussion Groups:* Facilitated small-group peer support circles—whether in-person at libraries or online—provide judgment-free spaces where adolescents share experiences and coping strategies, helping to reduce feelings of isolation and improve emotional support (Knapp *et al*., 2025; Ananya *et al*., 2025).

(2) *Gamified Media Literacy Circles:* Guided small-group discussions about real-world misinformation cases can be enhanced with game mechanics—points, levels, and challenges—to boost motivation and deepen learning. Studies in library contexts underscore that such gamification sustains engagement and helps youth internalize complex media-analysis skills (Knapp *et al*., 2023; Chen and Wu, 2021; Downie and Proulx, 2022).

(3) *Affinity Circles for Shared Identity:* Create smaller dialogue groups based on shared identities or experiences—such as LGBTQ + teens, first-generation immigrant youth, or young people with disabilities. These "affinity circles" offer culturally responsive, micro-safe spaces where participants can discuss media stressors and coping strategies unique to their community. Research indicates that identity-affirming peer groups bolster a sense of belonging and reduce minority stress, which in turn improves psychological well-being among both ethnic and sexual minority adolescents (Ghavami *et al*., 2011). Similarly, leveraging sociocultural identity has been shown to buffer poverty-related stress, demonstrating that interventions grounded in shared cultural strengths can enhance resilience in youth facing economic hardship (Rajagopalan *et al*., 2024).

By normalizing questions like "I saw this post—what do you make of it?" and providing a safe space for mutual aid, dialogue not only diffuses individual stress but also cultivates communal resilience (Doornbosch *et al*., 2024; Mutz and Martin, 2001). These conversation habits reinforce learning from the earlier DECODE steps—after defending personal boundaries, exposing and cross-checking content, organizing context, and documenting insights—by cementing understanding through social reflection.

Discussion

Memetic saturation and cognitive–emotional overload

The DECODE framework identifies memetic saturation— the flood of emotionally charged viral content, including memes—as a core driver of adolescent distress. Algorithms prioritize high-arousal posts (outrage, fear, humor) that hijack attention and exploit developing reward systems, perpetuating a feedback loop of emotional manipulation. Experimental and longitudinal studies link exposure to high-arousal media with increased negative mood, anxiety, and depressive symptoms in youth (Valkenburg and Peter, 2013; Valkenburg *et al*., 2022). Simultaneously, teens juggling nonstop notifications, feeds, and social comparisons experience cognitive overload: fragmented attention, sleep disruption, and decision fatigue that impair concentration, heighten irritability, and fuel a chronic stress response (Li *et al*., 2023; Dhir *et al*., 2018; Milli *et al*., 2025). Over time, this combined emotional and cognitive strain erodes resilience and deepens feelings of overwhelm. In this paper, memes are treated as one salient form of viral content—not as synonymous with it. Viral content encompasses a broader ecosystem of emotionally charged, shareable media, including videos, hashtags, and image macros. DECODE focuses on memes because they exemplify rapid, affect-driven circulation patterns.

Relational disconnection

Paradoxically, social media—while promising connection—often yields "thin" interactions that lack emotional depth, weakening real-world bonds and undermining empathy (Turkle, 2015; Baym, 2015). Adolescents may be more likely to engage in cyberbullying or hostile exchanges online—behaviors far less common in face-to-face settings. The 2017 "swatting" incident by Tyler Barriss, in which a false emergency call led to the tragic shooting of an uninvolved homeowner, starkly exemplifies how emotional detachment and the perceived invisibility of online action can result in real-world harm (Stevens and Chow, 2018). This relational disconnection compounds emotional exhaustion, leaving adolescents without the supportive networks essential for coping.

Libraries as epistemic moderators

Given the negative impact of memetic saturation and cognitive overload, public libraries and similar civic institutions have a crucial role to play in mitigating these effects. The DECODE framework suggests that libraries are uniquely positioned to serve as epistemic moderators, providing a counterbalance to the overwhelming, often unreliable information circulating online. By fostering media literacy, libraries can help teens become more discerning consumers of digital content, teaching them to evaluate the emotional and factual quality of the memes and posts (i.e. broader viral content) they encounter. This process is vital for helping youth navigate the complex digital landscape without succumbing to the emotional manipulation inherent in many viral trends.

In line with the DECODE framework, libraries can also provide access to alternative narratives and sources of support that challenge the dominant, emotionally charged content circulating on social media. By offering resources on mental health, personal development, and coping strategies, libraries can act as resilient knowledge hubs that offer teens the tools to process their emotions and build resilience against digital overload.

Specific roles of information institutions and guidance for practice

The findings also clarify the specific roles information institutions—particularly public and school libraries—can play in strengthening youth resilience in saturated digital environments. Existing evidence demonstrates that libraries already function as epistemic moderators, digital literacy hubs, and community anchors capable of mediating exposure to high-arousal digital content while empowering youth agency (Kwanya, 2023; Borji *et al.*, 2024; Adewojo *et al.*, 2024). The thematic patterns uncovered here map directly onto these institutional strengths: for example, libraries are uniquely positioned to host meme-literacy and fact-checking programs, support youth-led digital well-being initiatives, offer low-pressure reflective spaces to counteract cognitive overload, and facilitate peer-based information management practices. The DECODE framework therefore not only interprets adolescent digital distress but also operationalizes it into a set of actionable practices that libraries can adopt, adapt, or co-design with youth. Future practice should emphasize participatory co-design, continuous evaluation, and integration with broader community information ecosystems to ensure that interventions are context-sensitive and aligned with youth-driven norms.

Toward resilient digital youth

Youth already engage in communal information management—sharing tips, fact-checking, and supporting peers—often without institutional involvement. This reality underscores that resilience is not something libraries must impose. Instead, libraries can position themselves as optional collaborators, offering spaces, resources, and facilitation that amplify youth-led practices rather than replace them. Such a stance avoids presumptive authority and frames libraries as catalysts for co-designed solutions, complementing adaptive strategies teens

already employ online and offline. By centering agency and partnership, DECODE envisions a future where institutional support strengthens—not supplants—youth autonomy in navigating saturated digital environments.

Future directions

Building on DECODE, three research avenues stand out. First, design and evaluate digital-literacy programs that integrate emotional and cognitive strategies—teaching teens to spot their own overload cues, manage attention, and step away from harmful trends. Second, conduct longitudinal and vulnerability-focused studies to identify which adolescents (by personality, SES, or social support) are most at risk and why, enabling targeted interventions. Third, employ participatory methods—co-design workshops with youth— to refine DECODE's pillars, ensure cultural relevance, and reinforce autonomy-supportive practices. This includes strategies for addressing diverse forms of viral content beyond memes. Together, these efforts will move DECODE from a conceptual framework to empirically grounded, youth-centered solutions.

Limitations

This study relies on secondary, self-reported survey data (YRBSS, Pew), limiting causal inference and direct measurement of cognitive load. Its U.S.-focused samples may not generalize globally or across cultures. Finally, DECODE remains a conceptual framework—its effectiveness in real-world interventions awaits empirical validation through experimental or quasi-experimental trials.

Appendix

Reproducibility note

This paper is a conceptual, theory-building study that uses publicly available national survey summaries illustratively to motivate and scaffold the DECODE framework. No new data were collected or analyzed.

Data sources (public):

(1) CDC Youth Risk Behavior Survey System (YRBSS), National 2023.Published national results tables and documentation are available from the CDC YRBS website. Relevant items referenced in this manuscript include:

- *Electronic bullying*
- *Persistent sadness or hopelessness*
- *Seriously considered attempting suicide*
- *Made a suicide plan*
- *Attempted suicide*
- *Social media frequency/daily use*

(2) Pew Research Center — Teens, social media and mental health. (2025).Percentages cited in this paper (e.g., teens reporting being online "almost constantly," or daily use of major platforms such as YouTube, TikTok, Instagram, and Snapchat) are taken directly from the published Pew report.

Verification:

All prevalence figures cited in the Results can be verified by consulting the CDC's published YRBS national tables (via the YRBSS website or YRBSS Explorer) and the Pew Research Center's report tables. No additional statistical analysis was performed beyond reference to these publicly available sources.

References

Aagaard, J. (2021), "'From a small click to an entire action': exploring students' anti-distraction strategies", *Learning, Media and Technology*, Vol. 46 No. 3, pp. 355-365, doi: 10.1080/17439884.2021.1896540.

Adewojo, A.A., Esan, A.O. and Aleem, A.O. (2024), "Librarians as guardians of information quality: navigating the challenges of misinformation and disinformation", *Library Hi Tech News*, Vol. 41 No. 2, pp. 9-12, doi: 10.1108/LHTN-04-2024-0050.

Akıl, A.M., Ujhelyi, A. and Logemann, H.N.A. (2022), "Exposure to depression memes on social media increases depressive mood and it is moderated by self-regulation: evidence from self-report and resting EEG assessments", *Frontiers in Psychology*, Vol. 13, 880065, doi: 10.3389/fpsyg.2022.880065.

Ali, M.Y. and Richardson, J. (2025), "AI literacy guidelines and policies for academic libraries: a scoping review", *IFLA Journal*, Vol. 51 No. 3, pp. 588-599, doi: 10.1177/03400352251321192.

American Library Association (ALA) (2023), "Gen Z and Millennials: how they use public libraries and identify with librarianship", available at: https://www.ala.org/sites/default/files/advocacy/content/tools/Gen-Z-and-Millennials-Report%20%281%29.pdf

Ananya, A., Tuuli, J., Perowne, R. and Gutman, L.M. (2025), "Barriers and facilitators to user engagement and moderation for web-based peer support among young people: qualitative study using the behavior change wheel framework", *JMIR Human Factors*, Vol. 12, doi: 10.2196/64097.

Aytac, S. and Mizrachi, D. (2022), "The mindfulness framework for implementing mindfulness into information literacy instruction", *The Reference Librarian*, Vol. 63 Nos 1-2, pp. 43-61, doi: 10.1080/02763877.2022.2030273.

Bakir, V. and McStay, A. (2018), "Fake news and the economy of emotions", *Digital Journalism*, Vol. 6 No. 2, pp. 154-175, doi: 10.1080/21670811.2017.1345645.

Baym, N.K. (2015), *Personal Connections in the Digital Age*, 2nd ed., Polity Press, Cambridge.

Berryman, C., Ferguson, C.J. and Negy, C. (2018), "Social media use and mental health among young adults", *Psychiatric Quarterly*, Vol. 89 No. 2, pp. 307-314, doi: 10.1007/s11126-017-9535-6.

Borji, S., Panahi, S. and Razmgir, M. (2024), "The role of health librarians in combating misinformation: evidence from the COVID-19 pandemic", *Information Development*. doi: 10.1177/02666669241306721.

Boyle, C. (2022), "How do you meme?: using memes for information literacy instruction", *The Reference Librarian*, Vol. 63 No. 3, pp. 82-101, doi: 10.1080/02763877.2022.2084210.

Brady, W.J., Wills, J.A., Jost, J.T., Tucker, J.A. and Van Bavel, J.J. (2017), "Emotion shapes the diffusion of moralized content in social networks", *Proceedings of the National Academy of Sciences*, Vol. 114 No. 28, pp. 7313-7318, doi: 10.1073/pnas.1618923114.

Bruns, A. and Burgess, J. (2015), "Twitter hashtags from ad hoc to calculated publics", in Bruns, A. and Burgess, J. (Eds), *#HashtagPublics*, Peter Lang, New York, pp. 13-28.

Celiktutan, B., Cadario, R. and Morewedge, C.K. (2024), "People see more of their biases in algorithms", *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 121 No. 16, e2317602121, doi: 10.1073/pnas.2317602121.

Centers for Disease Control and Prevention (CDC) (2023), *Youth Risk Behavior Surveillance System (YRBSS): 2023 National Public-Use Data Files*, U.S. Department of Health and Human Services, available at: https://www.cdc.gov/yrbs/data/index.html

Centers for Disease Control and Prevention (CDC) (2024), *Youth Risk Behavior Survey Data Summary and Trends Report: 2013-2023*, U.S. Department of Health and Human Services, available at: https://www.cdc.gov/healthyyouth/data/yrbs/index.htm

Chen, H.L. and Wu, C.T. (2021), "A digital role-playing game for learning: effects on critical thinking and motivation", *Interactive Learning Environments*, Vol. 31 No. 5, pp. 3018-3030, doi: 10.1080/10494820.2021.1916765.

Cohen, S. and Wills, T.A. (1985), "Stress, social support, and the buffering hypothesis", *Psychological Bulletin*, Vol. 98 No. 2, pp. 310-357, doi: 10.1037/0033-2909.98.2.310.

Cook, J., Lewandowsky, S. and Ecker, U.K.H. (2017), "Neutralizing misinformation through inoculation: exposing misleading argumentation techniques reduces their influence", *PLoS One*, Vol. 12 No. 5, e0175799, doi: 10.1371/journal.pone.0175799.

Cooper, M.E., Cunsolo, A., Aylward, B., Yamamoto, S.S. and Harper, S.L. (2025), "'Feeling your emotions is an act of rebellion': How climate cafés across Canada support youth wellbeing during the climate crisis", *Social Science and Medicine (1982)*, Vol. 376, p. 376, doi: 10.1016/j.socscimed.2025.118002.

Copeland, S. and de Moor, A. (2018), "Community digital storytelling for collective intelligence: towards a storytelling cycle of trust", *AI and Society*, Vol. 33 No. 1, pp. 101-111, doi: 10.1007/s00146-017-0744-1.

Coriasco, M., Brittain, A.C., Thacker, A. and Van Son, C. (2025), "Memes as health communication through the lens of COVID-19: a concept analysis", *Discov Public Health*, Vol. 22 No. 1, p. 231, doi: 10.1186/s12982-025-00630-6.

Danermark, B., Ekström, M., Jakobsen, L. and Karlsson, J.C. (2002), *Explaining Society: Critical Realism in the Social Sciences*, Routledge, London.

Dawkins, R. (1976), *The Selfish Gene*, Oxford University Press, Oxford.

De, D., El Jamal, M., Aydemir, E. and Khera, A. (2025), "Social media algorithms and teen addiction: neurophysiological impact and ethical considerations", *Cureus*, Vol. 17 No. 1, e77145, doi: 10.7759/cureus.77145.

Department for Professional Employees (AFL-CIO) (2024), "Library professionals: facts and figures [Fact sheet]", available at: https://static1.squarespace.com/static/5d10ef48024ce300010f0f0c/t/6671ca759055c37f09ae199c/1718733429144/Library+Professionals+Facts+%26+Figures+2024.pdf

Dhir, A., Yossatorn, Y., Kaur, P. and Chen, S. (2018), "Online social media fatigue and psychological wellbeing—a study of compulsive use, fear of missing out, and fatigue", *International Journal of Information Management*, Vol. 40, pp. 141-152, doi: 10.1016/j.ijinfomgt.2018.01.012.

Domoff, S.E., Foley, R.P. and Ferkel, R. (2020), "Addictive phone use and academic performance in adolescents", *Human Behavior and Emerging Technologies*, Vol. 2 No. 2, pp. 106-116, doi: 10.1002/hbe2.177.

Doornbosch, L.M., van Vuuren, M. and de Jong, M.D.T. (2024), "Brave conversations within safe spaces: exploring participant behavior in community dialogues", *Small Group Research*, Vol. 56 No. 4, pp. 726-764, doi: 10.1177/10464964241302071.

Downie, S. and Proulx, S. (2022), "Investigating the role of gamification in public libraries' literacy-centered youth programming", *International Journal of Play*, Vol. 11 No. 4, pp. 382-404, doi: 10.1080/21594937.2022.2136637.

Eppler, M.J. and Burkhard, R.A. (2007), "Visual representations in knowledge management: framework and cases", *Journal of Knowledge Management*, Vol. 11 No. 4, pp. 112-122, doi: 10.1108/13673270710762756.

Fazelpour, S. and Danks, D. (2021), "Algorithmic bias: senses, sources, solutions", *Philosophy Compass*, Vol. 16 No. 8, e12760, doi: 10.1111/phc3.12760.

Gao, H., Shen, E., Losh, S. and Turner, J. (2007), "A review of studies on collaborative concept mapping: what have we learned about the technique and what is next?", *Journal of Interactive Learning Research*, Vol. 18 No. 4, pp. 479-492.

Ghavami, N., Fingerhut, A., Peplau, L.A., Grant, S.K. and Wittig, M.A. (2011), "Testing a model of minority identity achievement, identity affirmation, and psychological well-being among ethnic minority and sexual minority individuals", *Cultural Diversity and Ethnic Minority Psychology*, Vol. 17 No. 1, pp. 79-88, doi: 10.1037/a0022532.

Green, M.P. (2020), "Inclusive library service to individuals with mental illnesses and disorders", *The International Journal of Information, Diversity, and Inclusion*, Vol. 4 No. 1, pp. 119-126, available at: https://www.jstor.org/stable/48644529

Gross, B.M. (1964), *The Managing of Organizations: The Administrative Struggle*, Free Press, New York.

Haapala, E.A., Leppänen, M.H., Kosola, S., Appelqvist-Schmidlechner, K., Kraav, S.L., Jussila, J.J., Tolmunen, T., Lubans, D.R., Eloranta, A.M., Schwab, U. and Lakka, T.A. (2025), "Childhood lifestyle behaviors and mental health symptoms in adolescence", *JAMA Network Open*, Vol. 8 No. 2, e2460012, doi: 10.1001/jamanetworkopen.2024.60012.

Hamilton, J.L., Torous, J., Szlyk, H.S., Biernesser, C., Kruzan, K.P., Jensen, M., Reyes-Portillo, J., Primack, B.A., Zelazny, J. and Weigle, P. (2024), "Leveraging digital media to promote youth mental health: flipping the script on social media-related risk", *Current treatment Options in Psychiatry*, Vol. 11 No. 2, pp. 67-75, doi: 10.1007/s40501-024-00315-y.

Hee, M.S., Cao, R., Chakraborty, T. and Lee, R.K.-W. (2024), "Understanding (dark) humour with Internet meme analysis", *Proceedings of the 2024 International Symposium on Social Media Studies*, ACM, New York, pp. 1276-1279, doi: 10.1145/3589335.3641249.

Hornsey, M.J. (2020), "Why facts are not enough: understanding and managing the motivated rejection of science", *Current Directions in Psychological Science*, Vol. 29 No. 6, pp. 583-591, doi: 10.1177/0963721420969364.

Humprecht, E., Esser, F. and Van Aelst, P. (2020), "Resilience to online disinformation: a framework for cross-national comparative research", *The International Journal of Press/Politics*, Vol. 25 No. 3, pp. 493-516, doi: 10.1177/1940161219900126.

Hutmacher, F., Schläger, L. and Meerson, R. (2023), "Autobiographical memory in the digital age: insights based on the subjective reports of users of smart journaling apps", *Applied Cognitive Psychology*, Vol. 37 No. 4, pp. 686-698, doi: 10.1002/acp.4033.

Iaia, P.L. (2023), "Debunking fake news through the multimodal composition of internet memes", in Maci, S., Demata, M., McGlashan, M. and Seargeant, P. (Eds), *The Routledge Handbook of Discourse and Disinformation*, Routledge, London, pp. 245-262.

Johansson, P., Enoch, F., Hale, S.A., Vidgen, B., Bereskin, C., Margetts, H.Z. and Bright, J. (2023), "How can we combat online misinformation? A systematic overview of current interventions and their efficacy", *SSRN*, preprint, doi: 10.2139/ssrn.4648332.

Jordaan, M. and Mennega, N. (2023), "Capturing memories: an engaged research project using community digital storytelling", *The International Journal of Interdisciplinary Social and Community Studies*, Vol. 20 No. 1, pp. 97-111, doi: 10.18848/2324-7576/cgp/v20i01/97-111.

Kalyuga, S., Chandler, P. and Sweller, J. (2004), "When redundant on-screen text in multimedia technical instruction can interfere with learning", *Human Factors*, Vol. 46 No. 3, pp. 567-581, doi: 10.1518/hfes.46.3.567_30392.

Kardefelt-Winther, D. (2014), "A conceptual and methodological critique of Internet addiction research", *International Journal of Mental Health and Addiction*, Vol. 12 No. 1, pp. 1-13, doi: 10.1007/s11469-013-9470-5.

Keyes, K.M., Gary, D., O'Malley, P.M., Hamilton, A. and Schulenberg, J. (2019), "Recent increases in depressive symptoms among US adolescents: trends from 1991 to 2018", *Social Psychiatry and Psychiatric Epidemiology*, Vol. 54 No. 8, pp. 987-996, doi: 10.1007/s00127-019-01697-8.

Knapp, A.A., Hersch, E., Wijaya, C., Herrera, M.A., Kruzan, K.P., Carroll, A.J., Lee, S., Baker, A., Gray, A., Harris, V., Simmons, R., Kour Sodhi, D., Hannah, N., Reddy, M., Karnik, N.S., Smith, J.D., Brown, C.H. and Mohr, D.C. (2023), "'The library is so much more than books': considerations for the design and implementation of teen digital mental health services in public libraries", *Frontiers in Digital Health*, Vol. 5, 1183319, doi: 10.3389/fdgth.2023.1183319.

Khair Allah, R. (2023), "The use of miro in teaching practice", *Exchanges: The Interdisciplinary Research Journal*, Vol. 10 No. 3, pp. 77-97, doi: 10.31273/eirj.v10i3.1277.

Knapp, A.A., Cohen, K., Kruzan, K.P., Kornfield, R., Herrera, M., Pederson, A.B., Lee, S., Macapagal, K., Roulston, C.A., Clarke, K., Wijaya, C., Simmons, R., Jackson, L., Kour, S., Franco, S. and Mohr, D.C. (2025), "Teen perspectives on integrating digital mental health programs for teens into public libraries ('I was always at the library'): qualitative interview study", *JMIR formative research*, Vol. 9, e67454, doi: 10.2196/67454.

Kont, J., Elving, W., Broersma, M. and Bozdağ, Ç. (2024), "What makes audiences resilient to disinformation? Integrating micro, meso, and macro factors based on a systematic literature review", *Communications*, Vol. 50 No. 2, pp. 534-555, doi: 10.1515/commun-2023-0078.

Kwanya, T. (2023), "From collections to connections: transforming libraries to knowledge centres", in Fombad, M.C., Chisita, C.T., Onyancha, O.B. and Minishi-Majanja, M.K. (Eds), *Information Services for a Sustainable Society: Current Developments in an Era of Information Disorder*, De Gruyter, Berlin, pp. 320-341.

Leblanc, S., Bauer, S. and Mohiyeddin, C. (2014), "Expressive writing and health", in Mohiyeddini, C. (Ed.), *Advances in Psychological Research on Health Behavior*, Nova Science, Hauppauge, pp. 23-38.

Li, K., Jiang, S., Yan, X. and Li, J. (2023), "Mechanism study of social media overload on health self-efficacy and anxiety", *Heliyon*, Vol. 10 No. 1, e23326, doi: 10.1016/j.heliyon.2023.e23326.

Lindgren, A.-L. and Backman Prytz, S. (2025), "Timeline-thinking practice for interdisciplinary child studies research: the case of school sex education", *Barn – forskning om barn og barndom i Norden*, Vol. 43 Nos 1-2, doi: 10.23865/barn.v42.6358.

Livingstone, S., Stoilova, M. and Nandagiri, R. (2019), *Children's Data and Privacy Online: Growing up in a Digital Age*, London School of Economics and Political Science, London.

Luo, Y. and Ng, Y.-L. (2025), "Exploring the mediating role of online social capital in the association between sharing memes using four humor styles and subjective well-being", *Social Media + Society*, Vol. 11 No. 2, 20563051251348922, doi: 10.1177/20563051251348922.

Lyngs, U., Willadsen, H., Møller-Jensen, M. and Lukoff, K. (2024), "Digital self-control in Danish high schools: a pilot intervention study", *Adjunct proceedings of the 2024 Nordic Conference on Human-Computer Interaction (NordiCHI "24 Adjunct")*, Uppsala, ACM, New York, pp. 1-6, doi: 10.1145/3677045.3685423.

McGrew, S., Breakstone, J., Ortega, T., Smith, M. and Wineburg, S. (2017), "Can students evaluate online sources? Learning from assessments of civic online reasoning", *Theory and Research in Social Education*, Vol. 46 No. 2, pp. 165-193, doi: 10.1080/00933104.2017.1280907.

Milli, S., Carroll, M., Wang, Y., Pandey, S., Zhao, S. and Dragan, A.D. (2025), "Engagement, user satisfaction, and the amplification of divisive content on social media", *PNAS Nexus*, Vol. 4 No. 3, pgaf062, doi: 10.1093/pnasnexus/pgaf062.

Milner, R.M. (2016), *The World Made Meme: Public Conversations and Participatory Media*, MIT Press, Cambridge.

Mohamed, N.H., Beckstein, A., Winship, G., Ashraf Khan Mou, T., Pang, N.T.P. and Relojo-Howell, D. (2023), "Effects of self-expressive writing as a therapeutic method to relieve stress among university students", *Journal of Poetry Therapy*, Vol. 36 No. 3, pp. 243-255, doi: 10.1080/08893675.2023.2174678.

Montag, C. and Walla, P. (2016), "Carpe diem instead of losing your social mind: beyond digital addiction and why we all suffer from digital overuse", *Cogent Psychology*, Vol. 3 No. 1, 1157281, doi: 10.1080/23311908.2016.1157281.

Müller, K.W. and Scherer, L. (2022), "Exzessive Nutzungsmuster und Internetnutzungsstörungen: Effekte auf die psychosoziale und kognitive Entwicklung von Jugendlichen [Excessive Use Patterns and Internet Use Disorders: Effects on Psychosocial and Cognitive Development in Adolescence]", *Praxis der Kinderpsychologie und Kinderpsychiatrie*, Vol. 71 No. 4, pp. 345-361, doi: 10.13109/prkk.2022.71.4.345.

Murthy, V.H. (2023), *Social Media and Youth Mental Health: The U.S. Surgeon General's Advisory*, U.S. Department of Health and Human Services, Washington.

Mutz, D.C. and Martin, P.S. (2001), "Facilitating communication across lines of political difference: the role of public discussion networks", *American Political Science Review*, Vol. 95 No. 1, pp. 97-114.

Nasser, N.S., Sharifat, H., Rashid, A.A., Hamid, S.A., Rahim, E.A., Loh, J.L., Ching, S.M., Hoo, F.K., Ismail, S.I.F., Tyagi, R., Mohammad, M. and Suppiah, S. (2020), "Cue-reactivity among young adults with problematic Instagram use in response to Instagram-themed risky behavior cues: a pilot fMRI study", *Frontiers in Psychology*, Vol. 11, 556060, doi: 10.3389/fpsyg.2020.556060.

National Academies of Sciences, Engineering, and Medicine (2024), *Social Media and Adolescent Health*, The National Academies Press, Washington.

Nautiyal, P. and Chakraborty, I. (2023), "Memes as a coping tool: exploring the role of meme culture in navigating existential dread", *International Journal of Indian Psychology*, Vol. 11 No. 3, pp. 3563-3570, doi: 10.25215/1103.332.

Ng, D.T.K., Su, J., Leung, J.K.L. and Chu, S.K.W. (2023), "Artificial Intelligence (AI) literacy education in secondary schools: a review", *Interactive Learning Environments*, Vol. 32 No. 10, pp. 6204-6224, doi: 10.1080/10494820.2023.2255228.

Novak, J.D. and Cañas, A.J. (2008), "The theory underlying concept maps and how to construct and use them", *Institute for Human and Machine Cognition*, available at: http://cmap.ihmc.us/docs/theory-of-concept-maps

Nygren, T., Guath, M., Axelsson, C.-A.W. and Frau-Meigs, D. (2021), "Combatting visual fake news with a professional fact-checking tool in education in France, Romania, Spain and Sweden", *Information*, Vol. 12 No. 5, p. 201, doi: 10.3390/info12050201.

Obar, J.A. and Oeldorf-Hirsch, A. (2020), "The clickwrap: a political economic mechanism for manufacturing consent on social media", *Social Media + Society*, Vol. 6 No. 3, doi: 10.1177/2056305120948166.

OECD (2024), *Facts not Fakes: Tackling Disinformation, Strengthening Information Integrity*, OECD Publishing, Paris, doi: 10.1787/d909ff7a-en.

Okada, A. (2025), *Knowledge Cartography for Young Thinkers. Sustainability Issues, Mapping Techniques and AI Tools*, Springer, Cham.

Orben, A. and Przybylski, A.K. (2019), "Screens, teens, and psychological well-being: evidence from three time-use-diary studies", *Psychological Science*, Vol. 30 No. 5, pp. 682-696, doi: 10.1177/0956797619830329.

Panther, L. and Siegel, P. (2023), "'I want to use my voice': youth literacies disrupting critical memetic analysis", in Panther, L. and Crovitz, D. (Eds), *Critical Memetic Literacies in English Education: How Do You Meme?*, Routledge, London, pp. 45-62.

Peirce, C.S. (1878), "How to make our ideas clear", *Popular Science Monthly*, Vol. 12, pp. 286-302.

Pew Research Center (2025), "Teens, social media and mental health", available at: https://www.pewresearch.org/internet/2025/04/22/teens-social-media-and-mental-health/

Pitua, I. and Raizudheen, R. (2025), "Short communication: Mpox memes, the gift that conceals a blade", *PLOS Glob Public Health*, Vol. 5 No. 5, e0004496, doi: 10.1371/journal.pgph.0004496.

Philbin, M.M., Parker, C.M., Flaherty, M.G. and Hirsch, J.S. (2019), "Public libraries: a community-level resource to advance population health", *Journal of Community Health*, Vol. 44 No. 1, pp. 192-199, doi: 10.1007/s10900-018-0547-4.

Rajagopalan, A., Vaid, E., Scheinberg, B., Genaro, B.G. and Wadsworth, M.E. (2024), "Utilizing sociocultural identity to cope with poverty-related stress: methodological insights from developing a coping intervention", *Identity*, Vol. 25 No. 2, pp. 216-226, doi: 10.1080/15283488.2024.2383750.

Rayland, A. and Andrews, J. (2023), "From social network to peer support network: opportunities to explore mechanisms of online peer support for mental health", *JMIR Mental Health*, Vol. 10, e41855, doi: 10.2196/41855.

Reuter, C., Hughes, A.L. and Buntain, C. (2024), "Combating information warfare: state and trends in user-centred countermeasures against fake news and misinformation", *Behaviour and Information Technology*, pp. 1-14, doi: 10.1080/0144929X.2024.2442486.

Roozenbeek, J. and van der Linden, S. (2019), "The fake news game: actively inoculating against the risk of misinformation", *Journal of Risk Research*, Vol. 22 No. 5, pp. 570-580, doi: 10.1080/13669877.2018.1443491.

Ryan, R.M. and Deci, E.L. (2000), "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being", *American Psychologist*, Vol. 55 No. 1, pp. 68-78, doi: 10.1037//0003-066x.55.1.68.

Santos, R.M.S., Mendes, C.G., Sen Bressani, G.Y., de Alcantara Ventura, S., de Almeida Nogueira, Y.J., de Miranda, D.M. and Romano-Silva, M.A. (2023), "The associations between screen time and mental health in adolescents: a systematic review", *BMC Psychology*, Vol. 11 No. 1, p. 127, doi: 10.1186/s40359-023-01166-7.

Schwartz, B. (2004), *The Paradox of Choice: Why More Is Less*, Harper Perennial, New York.

Shifman, L. (2014), *Memes in Digital Culture*, MIT Press, Cambridge.

Smitha, E.S., Sendhilkumar, S. and Mahalaksmi, G.S. (2018), "Meme classification using textual and visual features", in Hemanth, D. and Smys, S. (Eds), *Computational Vision and Bio Inspired Computing- Lecture Notes in Computational Vision and Biomechanics*, Springer International Publishing, Cham, Vol. 28, pp. 1015-1031.

Smyth, J.M. (1998), "Written emotional expression: effect sizes, outcome types, and moderating variables", *Journal of Consulting and Clinical Psychology*, Vol. 66 No. 1, pp. 174-184, doi: 10.1037/0022-006X.66.1.174.

Soboleva, E.V., Gorev, P.M., Suvorova, T.N. and Masharova, T.V. (2024), "Formation of creative thinking of schoolchildren using interactive timelines in the conditions of additional education", *Perspectives of Science and Education*, Vol. 67 No. 1, pp. 622-639, doi: 10.32744/pse.2024.1.35.

Stevens, M. and Chow, A.R. (2018), "Man pleads guilty to 'swatting' hoax that resulted in a fatal shooting", *The New York Times*.

Stewart, J.L., Christner, R.W., Mulligan, C.A. and Fox, E. (2024), "Building healthy media and device habits: a CBT-based roadmap", in Christner, R.W., Stewart, J.L. and Mulligan, C.A. (Eds), *Handbook of Cognitive-Behavior Group Therapy with Children and Adolescents*, 2nd ed., Routledge, London, pp. 193-220.

Suárez-Perdomo, A., Garcés-Delgado, Y. and Arvelo-Rosales, C.N. (2025), "Systematic review on adolescents' construction of media literacy in educational settings", *The Review of Education*, Vol. 13 No. 1, e70048, doi: 10.1002/rev3.70048.

Sweller, J., Ayres, P. and Kalyuga, S. (2011), *Cognitive Load Theory*, Springer, New York.

Thoits, P.A. (2011), "Mechanisms linking social ties and support to physical and mental health", *Journal of Health and Social Behavior*, Vol. 52 No. 2, pp. 145-161, doi: 10.1177/0022146510395592.

Thomson, A., Lawrence, E.G., Oliver, B.R., Wright, B. and Hosang, G.M. (2024), "Self-directed digital interventions for the improvement of emotion regulation-effectiveness for mental health and functioning in adolescents: protocol for a systematic review", *BMJ Open*, Vol. 14 No. 4, e081556, doi: 10.1136/bmjopen-2023-081556.

Tian, Y., Chan, T.J., Liew, T.W., Chen, M.H. and Liu, H.N. (2025), "Overwhelmed online: investigating perceived overload effects on social media cognitive fatigue via stressor–strain–outcome model", *Library Hi Tech*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/LHT-03-2024-0145.

Timmermans, S. and Tavory, I. (2012), "Theory construction in qualitative research: from grounded theory to abductive analysis", *Sociological Theory*, Vol. 30 No. 3, pp. 167-186, doi: 10.1177/0735275112457914.

Turkle, S. (2015), *Reclaiming Conversation: The Power of Talk in a Digital Age*, Penguin Books, New York.

Twenge, J.M., Joiner, T.E., Rogers, M.L. and Martin, G.N. (2018), "Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time", *Clinical Psychological Science*, Vol. 6 No. 1, pp. 3-17, doi: 10.1177/2167702617723376.

Uhls, Y.T., Ellison, N.B. and Subrahmanyam, K. (2017), "Benefits and costs of social media in adolescence", *Pediatrics*, Vol. 140 No. Suppl 2, pp. S67-S70, doi: 10.1542/peds.2016-1758E.

Valkenburg, P.M. and Peter, J. (2013), "The differential susceptibility to media effects model", *Journal of Communication*, Vol. 63 No. 2, pp. 221-243, doi: 10.1111/jcom.12024.

Valkenburg, P.M., Meier, A. and Beyens, I. (2022), "Social media use and its impact on adolescent mental health: an umbrella review of the evidence", *Current Opinion in Psychology*, Vol. 44, pp. 58-68, doi: 10.1016/j.copsyc.2021.08.017.

Vanderbilt, S.K. and Ralston, D.J. (2023), "Young people reading and writing the world through meme curation, creation, and critical conversation", in Panther, L. and Crovitz, D. (Eds), *Critical Memetic Literacies in English Education: How Do You Meme?*, Routledge, London, pp. 114-122.

VanSledright, B. (2014), *Assessing Historical Thinking and Understanding: Innovative Designs for New Standards*, Routledge, London.

Vosoughi, S., Roy, D. and Aral, S. (2018), "The spread of true and false news online", *Science*, Vol. 359 No. 6380, pp. 1146-1151, doi: 10.1126/science.aap9559.

Vraga, E.K. and Tully, M. (2019), "News literacy, social media behaviors, and Skepticism toward information on social media", *Information, Communication and Society*, Vol. 24 No. 2, pp. 150-166, doi: 10.1080/1369118X.2019.1637445.

Wineburg, S. and McGrew, S. (2019), "Lateral reading and the nature of expertise: reading less and learning more when evaluating digital information", *Teachers College Record*, Vol. 121 No. 11, pp. 1-40, doi: 10.1177/016146811912101102.

Yang, S. and Banks, A. (2024), "Enhancing AI literacy: a collaborative self-study of elementary teacher educators", *Studying Teacher Education*, Vol. 21 No. 3, pp. 1-21, doi: 10.1080/17425964.2024.2434213.

Young, R. and Tully, M. (2022), "Autonomy vs. control: associations among parental mediation, perceived parenting styles, and U. S. adolescents' risky online experiences", *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, Vol. 16 No. 2, doi: 10.5817/CP2022-2-5.

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