IJARST

International Journal of Advanced Research in Science and Technology

https://doi.org/10.62226/ijarst20262856

ISSN 2319 – 1783 (Print)

ISSN 2320 – 1126 (Online)

The Psychological and Pedagogical Implications of Red-Ink in Academics: A Narrative Review

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ARTICLEINFO

Article history:

Received	06 Oct 2026
Accepted	17 Oct 2026
Available online	28 Oct 2026

Keywords:

Red-pen effect, colour psychology, formative assessment, impostor phenomenon, rubrication, higher education assessment

Indexed in:

and in major libraries

ABSTRACT

The colour of a teacher's pen is rarely treated as a variable worth examining, yet research in colour psychology and educational assessment suggests that red ink carries evaluative significance well beyond its function as a marking tool. This article is a short review from cognitive psychology, on how red-ink feedback shapes learner emotion and motivation from early childhood through tertiary education, Evidence indicates that red activates avoidance-oriented psychological responses in students toward harsher evaluation. The review argues that the psychological cost of red ink does not diminish with a learner's age or seniority; it changes in character, from generalised distress in young children to identity threatening.

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1. Introduction

Among the tools of academic grading, the red pen occupies a position that is culturally loaded in a way few classroom objects are. Historically tied to correction and emphasis, red ink has become nearly synonymous with error in classrooms across the world. Work in cognitive psychology, educational assessment, and sociocultural studies suggest that the colour itself is doing more than making corrections visible, it shapes how students feel, how teachers grade and the emotional climate of the classroom more broadly.

This review takes a developmental approach by tracing the evidence from early childhood through primary and secondary schooling, into undergraduate and tertiary education, and into postgraduate and professional training, with sustained attention to two contexts namely, the Indian academic system, which is largely shaped by colonial inheritance, contemporary reform and specific education, where dense, high-volume correction of technical work is routine but rarely examined through the lens of colour. Hence it is felt that feedback colour deserves the same scrutiny as feedback content, relating to what is actually at stake at each stage of a learner's training.

2. Literature Review

2.1 Historical Origins of Red Ink in Instructional Context

Well before the modern classroom existed red pigment was used to mark text as important, or as deviating from a norm. The association of red with textual emphasis and correction is old enough that its origins are usually traced back to Pharaonic Egypt, where scribes used red ink to mark headings and section breaks on papyri. Medieval European scribes used rubrication, that is, red lettering for headings, initials, and marginal notes, to draw the eye to what mattered on a page, a practice whose techniques and purposes are documented in detail by (Clemens and Graham, 2007). What changed with the rise of mass schooling was not the colour but its function, red stopped marking importance and started marking error.

British colonial education systems, through the eighteenth and nineteenth centuries, standardised red ink for correction across much of the colonised world, India too followed the British system (Bhattacharya, 1998). Grading notebooks, examination scripts, and administrative corrections were marked in red as a matter of course, a convention that outlasted colonial rule itself and persisted largely unexamined into post-Independence schooling. Because the colour's institutional dominance

arrived through administrative habit rather than pedagogical evidence, nobody had much reason to test whether it actually worked until psychological research began doing so.

2.2 Colour Psychology and the Basis of Red's Evaluative Effect

Red carries associations with danger, error, and prohibition that are rooted in both cultural symbolism and, plausibly, biological salience (Elliot and Maier, 2014: 95-120). In academic settings specifically, Elliot and colleagues formed across six experiments that a brief,

pre-task glimpse of red, on a test cover, a participant number, measurably impaired performance on IQ-type tasks they observed that participants shifted toward easier, safer choices, an effect that operated outside conscious awareness (Elliot et al 2014: 154-68). Because the response sits below deliberate thought, it affects students regardless of how carefully an accompanying written comment is worded the colour itself is doing psychological work independent of content.

Studies by Dukes and Albanesi gave undergraduates identical instructor comments, varying only the ink colour between red and aqua, and found the red-ink instructor was rated as markedly less nice, less enthusiastic, and lower in classroom rapport, even though students judged the instructor's knowledge and organisation no differently (Dukes and Albanesi, 2013 :96-100). The wording never changed; only the colour did, and that alone was enough to alter how students read the relationship with their instructor. The implication matters for the argument that follows: if colour shapes relational perception independently of content, softening the language of feedback cannot, on its own, fix what red ink is doing.

3. Methodology

This is a narrative, an integrative review. Sources were drawn from peer-reviewed journals in colour psychology, higher-education and higher education assessment, and developmental psychology, together with Indian education-policy material and contemporary reporting on pedagogical reform. The review follows a single developmental axis, the stage of education at which red-ink feedback is received, from early childhood through primary, secondary, undergraduate, tertiary technical, postgraduate, and professional training. The present review does not claim to be exhaustive; it aims to show a coherent pattern across the sources that do exist, and to flag where the evidence base, particularly for Indian educational contexts, remains thin and would benefit from dedicated empirical study.

4. Findings and Discussion by Educational Stage

4.1 Early Childhood and Primary Education

The clearest and most consistently documented effects of red-ink feedback show up at the youngest ages, where children have not yet developed the vocabulary to separate an error in a specific answer from a judgement about themselves as a learner. Because academic self-concept is still forming at this stage, repeated exposure to heavily red-marked work plausibly generalises into a lasting association between schoolwork and threat, an association the priming research suggests is triggered automatically rather than reasoned through (Elliot et al, 2014 154-68). It is this vulnerability that has driven visible reform at the primary level, Indian preschools and a number of CBSE-affiliated primary schools have moved away from red altogether, replacing it with green, purple, or pink, a shift that psychologists working with young children attribute to how directly colour is read emotionally before a child has the cognitive tools to separate colour from content (Sharma.N, 2026) .

4.2 Secondary Education and Board Examinations

Secondary schooling adds a layer of pressure primary school does not have, higher stakes, standardised board examinations whose results shape access to higher education. Here the red-pen tradition intersects with examiner behaviour as much as with student perception. Evaluators marking large volumes of scripts under time pressure are themselves susceptible to the priming effects documented in achievement-context research, and because board exam stakes are so high, any colour-driven shift toward harsher marking has consequences reaching well beyond a single classroom relationship. Adolescents, meanwhile, read the social meaning of a heavily corrected script more acutely than younger children do, and red-ink feedback at this stage tends to reinforce a narrow, error-hunting mode of learning, one focused on locating and fixing discrete mistakes rather than reconsidering an argument's structure or a solution's method (Boud and Molloy, 2013). That surface-level orientation to feedback, built up over exam-driven secondary years, tends to travel with students into university.

4.3 Undergraduate Education

At university, students increasingly read feedback as commentary on their competence in a discipline rather than on a single assignment. A page of red markings on an essay or lab report is taken not merely as a set of local corrections but as evidence of deficiency (Clance and Imes, 1978: 241-47). Combined with the surface-correction habits inherited from secondary school, this identity-linked reading of red ink can discourage exactly the kind of academic risk-taking, an ambitious argument, an unconventional method, that universities say they value. Partly in response, universities in the United States, the United Kingdom, and Australia have moved toward multi-colour marking and digital annotation tools, which appear to preserve evaluative rigour while reducing the defensive, threat-oriented reading that red ink invites (Carless, 2015: 103-09).

4.4 Tertiary Technical Education

Engineering and applied-science programmes deserve separate treatment because the mechanics of correction here differ from the humanities and social-science contexts most of the existing literature draws on for example an engineering student's red ink rarely appears on continuous prose; it appears on problem-set derivations, circuit schematics, code listings, CAD drawings, and lab reports, where a single red mark can flag not a stylistic lapse but a structural error: a sign flipped in a free-body diagram, a race condition in a state machine, a component value that would not actually work in a physical circuit. The density of correction possible on this kind of work is high, and so, correspondingly, is the volume of red ink a technically dense submission can accumulate even when the underlying reasoning is largely sound.

Engineering education also relies heavily on the design review , a public or semi-public session in which a student's work is evaluated in front of peers and instructors, a format engineering programmes share with architecture and design studios. Dannels and colleagues' analysis of critique feedback across design education found that students consistently read critique less by its stated content than by what it implied about their competence and their standing relative to peers, and that novice students in particular struggled to separate criticism of the artefact from criticism of themselves (Dannels et al,2008). Red-annotated drawings or marked-up code brought into that setting compound the effect: the mark is no longer a private note between instructor and student but a visible signal read by an entire cohort.

This identity-linked reading of correction intersects with a phenomenon that engineering-education researchers have begun to study directly. Rosenstein and colleagues surveyed computer science students on the impostor phenomenon, the persistent, evidence-resistant sense of not belonging despite objective competence first described by (Clance and Imes,1978 :241-47), and found it substantially present within the discipline, without clear evidence that it fades as students advance through the degree (Rosenstein et al. 2020:30-36). Heavily marked-up code or a red-annotated derivation, arriving in a discipline where competence is often understood as binary, the circuit works or it does not, the proof holds or it does not, is well positioned to feed exactly this belief, since it offers little room to read an error as one part of an otherwise strong piece of work. A related mechanism is documented in Henning and colleagues' study of professional students more broadly, where perfectionism and heavy, high-stakes correction were among the strongest predictors of psychological distress independent of actual academic performance (Henning, K., et al. 1998: 456-64).

4.5 Postgraduate, Research Training, and Professional Programmes

The psychological stakes of red-ink feedback reach their peak once a learner is no longer simply being assessed but is being evaluated as a nascent member of a profession. Medical, legal, and engineering doctoral and professional programmes rely on dense, evaluative written feedback, and red-ink correction in these settings has been linked to heightened performance anxiety and to the broader phenomenon of impostor syndrome documented above (Henning, K., et al. 1998. 456-64; Clance and Imes, 1978 241-47). For doctoral candidates specifically, the dynamic is compounded by the supervisory relationship: heavily red-marked drafts are frequently read as punitive rather than developmental, which can erode the trust that exploratory, iterative research thinking depends on (Boud and Molloy, 2013). Tellingly, many supervisors and professional mentors have independently gravitated toward neutral-coloured annotation or typed digital comments, not because the underlying feedback has become less rigorous, but because the colour of the delivery mechanism had stopped serving the developmental purpose of the feedback itself.

5. The Indian Academic Context: Colonial Legacy, Reform, and Persistence

Indian schooling inherited red-ink marking directly from British administrative and pedagogical structures. Teachers, examiners, and universities institutionalised its use across notebooks, answer scripts, and report cards as the education policy took hold (Bhattacharya, 1998; Kumar, 2005), so that red became simultaneously a symbol of teacher authority and a signifier of error, embedded in the system well before any psychological evidence on its effects existed.

From the 2010s onward, Indian educators and preschool operators began questioning the emotional cost of red marking, particularly for young children, and a number of preschools and CBSE-affiliated primary schools have discontinued red ink altogether in favour of green, purple, or pink (Sharma, 2025). Although the Central Board of Secondary Education has issued no nationwide ban on red-pen use in classroom marking, its Continuous and Comprehensive Evaluation framework and its stated commitment to stress-free learning have been widely read by primary-level educators as tacit encouragement of non-red feedback systems (CBSE). Notably, CBSE's own examination regulations restrict students to blue or black ink for board-exam answer scripts and disallow red and green entirely, a rule justified on scanning and evaluation grounds rather than psychological ones, but one that inadvertently keeps red as an evaluator's colour rather than a student's, reinforcing its association with the examiner's authority.

This reform has not travelled upward through the system. Board examinations, college evaluation, and professional qualification assessment in India continue to rely on red ink largely without scrutiny. The result is a visible split: an Indian ten-year-old is increasingly likely to have her workbook marked in green or purple, while the same student, a decade later, sits an engineering examination or a viva graded in red by an evaluator working under the high-volume, tight deadline conditions that priming research suggests are especially conducive to harsher marking (Rutchick et al.2010: 704-08). The reform movement's stated rationale, protecting learners from unnecessary psychological harm, was never developmentally limited to small children; its absence from secondary, tertiary, and professional contexts looks more like institutional inertia than a considered judgement that older students and trainee engineers are immune to the effect.

6. The Red-Pen Effect on Evaluators

One mechanism deserves separate emphasis because it operates identically regardless of the age or stage of the learner being evaluated: the effect of red ink on the evaluator. (Rutchick et al.2010) found across three experiments that graders using a red pen identified more errors and assigned lower grades than graders using a blue pen, even when marking identical material (Rutchick et al.2010: 704-08). The colour appears to prime evaluators toward a more fault-finding stance before they have read a single word of the student's work. Because this mechanism resides in the grader rather than the learner, it does not attenuate with age, seniority, or academic stakes; a professor grading a doctoral dissertation or a senior design project is, in principle, as susceptible to this priming as a teacher grading a primary-school spelling test. This is arguably the strongest evidence against a common assumption in both the academic literature and the Indian reform debate, that red ink's costs are mainly a matter of younger students' fragile self-esteem. The evaluator's own

judgement, at every stage of education, is not neutral with respect to the colour of the pen in hand.

7. Discussion:

Toward Stage-Sensitive, Psychologically Informed Feedback

Taken together, the evidence surveyed here resists a common assumption embedded in current reform efforts: that red ink is mainly a problem for young children and becomes progressively less relevant as students mature. The mechanism changes character across the educational lifespan, from generalised emotional distress in early childhood, to reinforcement of surface-level, error-hunting habits in secondary school, to identity-threatening feedback in undergraduate and technical education, to impostor-inducing evaluation in postgraduate and professional training, but it does not disappear. If anything, the stakes attached to each successive stage grow larger even as institutional attention to the issue shrinks.

A stage-sensitive response would need to do more than swap red pens for green ones in primary classrooms. At the secondary, undergraduate, and tertiary technical level, where high-volume, high-density marking is unavoidable, digital annotation tools and multi-colour marking conventions offer a practical route to reducing both the student-facing and evaluator-facing effects of red ink without sacrificing the thoroughness engineering correction in particular requires (Carless, 2015: 103-09). In engineering programmes specifically, separating the marking of correctness from the marking of style or presentation, using one colour or channel strictly for factual or structural errors and a different, less loaded one for suggestions and style notes, could preserve the clarity red ink is prized for while reducing its tendency to read as a blanket verdict on competence. At the postgraduate and professional level, where the supervisory or mentoring relationship carries as much developmental weight as any single comment, deliberately choosing a neutral marking convention may do as much to protect a trainee's willingness to take intellectual risks as any change in the wording of feedback itself (Boud and Molloy, 2013).

8. Limitations of the Review

This review has limitations. It is narrative rather than systematic, and does not attempt an exhaustive or statistically weighted synthesis of every study on colour and assessment. The empirical base linking colour psychology specifically to Indian classrooms remains thin; much of the Indian-specific material cited here comes from professional discussions and press coverage of school-level practice rather than controlled experimental studies, and should be read as documenting institutional trends rather than measured psychological effects. Research on red ink specifically within engineering and technical education is sparse; the argument in section 4.4 draws on adjacent evidence, impostor-phenomenon prevalence in computer science, critique dynamics in design education, and the general priming literature, rather than a body of studies that isolates ink colour as a variable in technical-course grading. The foundational colour-priming and red-pen-effect studies were conducted primarily in Western, English-language academic settings, and their generalisability to Indian secondary, undergraduate, and engineering contexts, while plausible, has not been directly tested. Future research combining controlled experimental methods with Indian and engineering-student samples across multiple stages would substantially strengthen the case made here.

9. Conclusion

The use of red ink in academic assessment, historically considered, carries psychological and pedagogical consequences that extend well beyond the visibility the colour was originally chosen to provide. Its associations with error, danger, and punitive judgement shape both student perception and evaluator behaviour at every stage of formal education, from a six-year-old's first corrected spelling test to a graduate engineer's marked-up design report. In India, growing awareness of these consequences has prompted meaningful reform in primary education, but that reform has not yet reached the secondary, tertiary technical, and professional contexts where the stakes of feedback are, if anything, higher. Moving beyond red ink is not a matter of abandoning rigour; nothing in the evidence reviewed here suggests evaluators should mark less thoroughly or less honestly. It suggests instead that the colour in which that thoroughness is delivered is not a neutral choice, at any age or in any discipline, and that academic institutions at every level, including engineering faculties, where the standard remains almost entirely unexamined, have reason to reconsider it.

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