# Friction and Coordination in Schooling: Transactional Teaching, Relational Work, and the Limits of Educational Efficiency

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## Abstract

This paper argues that the future of equitable education depends on friction. I define friction as the experience of working through difficulty without immediate aid, involving time, presence, responsiveness, and relational investment. Through a synthesis of interactional, organizational, and sociological perspectives, I develop a conceptual model of transactional versus relational teaching, arguing that relational teaching generates productive friction that interrupts the smooth reproduction of inequality.

## 1 Introduction

In recent years, schools have seen a rapid expansion of educational technologies, particularly those built on Generative Artificial Intelligence (GenAI) and large language models (LLMs). These tools are now used across a wide range of instructional functions, including content generation, personalized learning pathways, and formative and summative assessment. GenAI is frequently positioned as a solution to longstanding challenges in schooling by promising to save time, reduce labor, and increase efficiency for both students and educators. This promise is compelling in part because schooling has long struggled to accommodate variation in how students access learning. Although the theory of fixed learning styles has been widely critiqued, it remains evident that students differ greatly in how they engage with academic tasks and institutional expectations. Core learning activities such as generating ideas, revising arguments, or persisting through conceptual uncertainty are experienced as frustrating or effortful, even when they are pedagogically necessary. AI tools for education are marketed as a way to remove these difficulties by "smoothing" the learning process, making it faster, more predictable, and more manageable. While the rapid diffusion of GenAI has intensified this trend, the drive to make education more efficient and less frictional predates contemporary AI systems. Efforts to smooth educational processes are often framed as both pragmatic and humane. Reducing teacher workload, automating differentiation, and streamlining assessment are presented as necessary responses to institutional pressures and resource constraints. Yet these efforts align closely with longstanding organizational logics of schooling that prioritize efficiency, standardization, and predictability (Tyack, 1974). Such pressures tend to encourage transactional forms of coordination between teachers and students, emphasizing coverage, compliance, and measurable outputs. A growing body of research on classroom interaction (Eder, 1981), organizational differentiation and tracking (Domina et al., 2019; Ochoa, 2013), and family–school relations suggests that these forms of smooth coordination come at a cost. They may suppress relational work and contribute to the reproduction of educational inequality.

This paper argues that the future of equitable education depends on friction. I define friction as the experience of working through difficulty without immediate aid, involving time, presence, responsiveness, and relational investment. Friction is increasingly rare in systems optimized for efficiency, yet it is central to learning and development. Through a synthesis of interactional,

organizational, and sociological perspectives, I develop a conceptual model of transactional versus relational teaching. I argue that relational teaching generates productive friction that interrupts the smooth, automatic reproduction of inequality by reducing reliance on students' prior access to cultural and institutional resources. In contrast to prevailing efforts to make schooling function as a streamlined, efficiency-oriented system, this paper contends that relational friction should be understood not as inefficiency, but as an essential condition for meaningful learning, motivation, and opportunity.

## 2 Smooth Schooling

Peak efficiency has long been a central goal in educational research and practice. This orientation posed fewer challenges when students were expected to engage with a common curriculum in uniform ways. However, increasing attention to individual differences in how students access and engage with learning led to calls for instructional approaches that offered multiple modalities or entry points.

Educational technologies were introduced in part to support this effort to make instruction more efficient while accommodating variation. Some systems tracked student progress through short, formative assessments, while others generated alerts to identify students in need of additional support and specify areas of difficulty. These tools allowed teachers to automate aspects of the otherwise labor-intensive process of identifying students' areas of weakness, estimating their zones of proximal development, and planning targeted instructional responses.

Alongside technologies designed to differentiate instruction, Learning Management Systems (LMSs) such as Blackboard and Canvas became widely adopted. These platforms were intended to improve efficiency in both grading and assignment submission. Importantly, LMSs were typically implemented at the institutional level, meaning that both teachers and students were structurally incentivized to use them as the primary medium for instructional exchange.

These efforts to improve efficiency and streamline instructional processes carried costs. As more instructional activity moved into digital platforms, students spent increasing amounts of time submitting work through online systems, while teachers spent more time interacting with interfaces rather than with students directly. As a result, opportunities for synchronous, face-to-face interaction between students and teachers were reduced.

In an AI-enabled context, these dynamics have intensified. A growing number of students now use AI tools to generate written work, including essays and other extended assignments. At the same time, teachers increasingly rely on AI to assist with grading and feedback. These practices further reduce direct interaction between students and teachers. AI systems make it possible for both parties to decrease workload while maintaining acceptable levels of output, a prospect that is particularly appealing given the institutional pressures faced by students and educators alike.

## 3 Friction

I use the term friction to describe the opposite of smooth schooling. Friction refers to instructional conditions in which learning involves difficulty, delay, and sustained effort rather than streamlined completion. To clarify this concept, consider a hypothetical schooling environment in which smoothness is minimized rather than optimized. In such a system, both students and teachers would encounter increased levels of difficulty, longer time commitments, and greater emotional and relational labor due to more frequent face-to-face interaction. Shortcuts would be limited, and instructional processes would be less standardized. Technology would play a more constrained role, and one-size-fits-all approaches would be avoided. Instead, instructional support would be continuously adjusted to students' zones of proximal development as learning unfolds.

At first glance, such an environment may appear undesirable, particularly given its increased demands on time and effort. However, this reaction reflects underlying assumptions about what educational systems are designed to optimize. Determining whether friction is desirable depends on how the purpose of schooling is defined. Questions about the goals of education have long occupied educational theorists and remain historically contingent. For example, in industrial contexts, schooling was often oriented toward producing compliant, standardized workers. In contemporary social and economic conditions, these aims are less clearly aligned with broader educational needs.

If schooling is instead oriented toward what humans do particularly well, developing relationships as a means of supporting learning, then friction becomes a necessary feature of the instructional process rather than a problem to be eliminated. The remainder of this paper examines what is at stake when friction is systematically removed from learning through transactional teaching practices, introduces theoretical lenses that support a relational account of teaching, and develops a typology that distinguishes relational and transactional modes of instructional coordination.

## 4 Two Postures

It is important to note that there is no firm body of literature that agrees on what the terms relational and transactional teaching mean. There is no unifying framework (Plantin Ewe & Fjelkner Pihl, 2024). Therefore, for the purposes of this paper, I will illustrate the difference between relational and transactional teaching by describing them as two competing, but not mutually exclusive, postures.

The transactional and relational labels are logics of coordination between teachers and students. Transactional teaching refers to an interactional logic in which teachers and students coordinate primarily through the exchange of completed work for evaluative feedback, typically operationalized as grades or scores. In contrast, relational teaching refers to an interactional logic in which teachers and students coordinate through ongoing, personalized engagement oriented toward students' development, understanding, and capacity for independent learning. A mixture of the two styles is observed in school settings. In individual classrooms, one posture may overpower the other. I will dissect each of these in the context of a few different domains to further explain.

Transactional teaching is less likely to produce productive friction for both teachers and students. For teachers, all the components of transactional teaching are easily automated after the technology has reached a certain point, and decisions around what grades to give students, whether a student should pass/fail, sorting/tracking students, etc. can be made by machines that are given explicit instructions or who operate on predictive algorithms.

Transactional teaching is less likely to produce productive friction for students, as well. If the coordination logic dictates that an exchange for work produces a grade (and a promise that the grade will unlock future career doors for them in the future), then students are motivated to use technology to shorten the effort needed to reach the desired outcome.

On the other hand, if our goal is to create friction that will lead to meaningful education, we want to adhere to the tenets of relational teaching. In this model, the system is less easy to smooth out through automation. A well-defined student trajectory, for instance, is not something that a large language model can generate, even with extensive prompting. It takes years of students getting critical mentorship, being asked curious/powerful questions, and being encouraged to do their own self-reflection to carve their path forward. This takes deliberate time, attention, and energy over many years.

Relational teaching, the key to learning that can't be hijacked by technology, necessarily creates friction. Yet, the technology industry and the education sector seem intent on moving to-

| Dimension | Transactional Posture | Relational Posture |
|---|---|---|
| Primary Object of Attention | Completed assignments | Nurtured/well-defined student learning trajectories |
| Coordination Logic | Exchange work for evaluation/grade | Ongoing development/Growth |
| Teacher role | Evaluator/gatekeeper | Mentor/guide/facilitator of thought |
| Student role | Task completer | Active learner with agency and responsibility |
| Assessment function | Sorting, tracking, and certification | Feedback and growth |
| Temporal focus | Short-term performance | Long-term development |

Table 1: Dimensions of Transactional vs. Relational Teaching

ward a smoother, and therefore more transactional, mode of operating. In the next section, I will refer to various theoretical contributions that support the argument for relational teaching.

# 5 Sociological Accounts of Teaching and Inequality

## 5.1 Educational inequality

Educational inequality is often explained in terms of differences in resources, curriculum, or student characteristics. An interactional lens focuses less on these distal factors, and more on the micro-level processes through which learning opportunities are produced in real time. From this perspective, what matters is not only what students are taught, but how teachers and students coordinate attention, effort, and participation during instructional encounters. These moment-to-moment interactional arrangements shape whether students are afforded time to struggle, opportunities to act independently, and sustained engagement with challenging material. All of these types of interactions are central to what this paper conceptualizes as productive friction.

A foundational example of this perspective can be found in Donna Eder's (1981) analysis of teacher–student interaction in ability-grouped reading instruction. Rather than treating ability grouping as a static organizational feature, Eder demonstrates how grouping decisions are enacted through interactional practices such as turn allocation, attention management, and instructional pacing. Her analysis shows that classrooms optimized for efficiency can unintentionally reduce students' opportunities to engage in independent problem-solving. In doing so, Eder provides a concrete illustration of how transactional coordination logics suppress productive friction at the interactional level, even in the absence of explicit intent to disadvantage students.

Learning opportunities are actively constituted through interactional coordination. Practices intended to preserve efficiency (such as minimizing disruption, maintaining pace, and managing attention) systematically reshape who is permitted to struggle, for how long, and under what conditions. From the standpoint of this paper, these findings clarify how productive friction is diminished through transactional interactional logics. Importantly, Eder shows that these effects happen without deliberate intent, highlighting how smooth schooling can reproduce inequality insidiously and subtly.

While an interactional lens illuminates how friction is produced or suppressed in moment-to-moment classroom encounters, an extension of her work would seek to explain why such coordination logics become dominant or stable across classrooms and institutions. To address this, the analysis must move beyond micro-interaction to consider how organizational structures, in-

stitutional incentives, and cultural expectations shape what kinds of teaching practices are feasible, rewarded, or discouraged. The next section therefore turns to sociological perspectives on schooling and stratification to examine how transactional coordination logics are reinforced at the organizational level, and how relational teaching (and the friction it requires) comes to be structurally marginalized rather than merely interactionally difficult.

### 5.2 Organizational & Institutional Logics of Schooling

Transactional teaching is a response to organizational demands such as efficiency, accountability, and standardization. As Tyack & Cuban (1995) argue, this is the stable "grammar" under which schools are managed. Trying to disrupt this stable grammar comes with many challenges that have quashed even the most ardent reformers' efforts. Placing the focus on relational teaching violates this grammar due the way it requires flexibility, time and ambiguity.

To extend this idea of "grammar," it is useful to understand why organizations seek to be efficient in the first place. Meyer & Rowan (1977) give a slightly more nuanced understanding of the underlying reason: organizations wish to be legitimate, and efficiency is often seen as the vehicle by which organizations will become legitimate, or as they put it, rational. What gets institutionalized is what becomes rational. This explains why efforts to go against the grain are often seen as irrational; it is not because of a lack of logic on behalf of the reformers, but more so a resistance from the system as a whole. Scott (2014) reinforces this claim by showing how institutions simplify complex activity. It is this so-called rational behavior that produces artifacts for outputs (grades, scores, etc.). These measures are easily auditable and signal rational control, but they also distort reality. Tacit knowledge and judgment—outputs of good relational teaching—are hard to formalize or audit. Therefore, transactional teaching is seen as more organizationally legible and relational is more opaque.

Educational inequality, then, is exacerbated by transactional teaching and along with it go a set of assumptions about student behavior. Transactional systems assume, for example, that students can easily interpret expectations, self-regulate their effort, and convert feedback into improvement. The reality of these assumptions is that these abilities are not evenly distributed. There are students who benefit from these transactional constructs. Specifically, transactional teaching provides an advantage to students who possess the cultural resources to decode expectations and self-direct learning without sustained relational support. Lareau demonstrates this point in the form of concerted cultivation opposing natural growth. Those who are skilled at asking for clarification, accustomed to adult negotiation, and skilled at institutional navigation will flourish in transactional systems. But these qualities are intertwined with class and often correlate to higher socio-economic status. Lareau demonstrates how these capacities are socially patterned, not innate. This is in direct contrast to who would benefit from relational teaching, those who do not have the cultural capital and learned institutional navigation that their peers do. Smooth schooling amplifies these inequities.

## 6 AI Accelerates and Amplifies the Existing Problem

Now that we have seen how transactional teaching fits in organizations, why it persists, and who it benefits, we will examine the emergence of Generative AI and the role that it plays in amplifying the qualities of the transactional teaching model. Transactional teaching is legible and scalable and invites a smoothness that is rewarded by school systems. Relational teaching is costly and opaque. Artificial Intelligence, which includes both the subcategories of generative AI, large language models (LLMs) and predictive AI, is primed to amplify the existing transactional teaching model. For the purposes of this paper, I will use the blanket term AI to refer all of these subcategories at once, and will identify subcategories only when the subcategory's qualities dif-

fer from the general AI category.

AI is being widely adopted in schools, but not because it transforms learning or provides more access to students; instead, it is adopted because it automates tasks that are already organized transactionally (Tan et al., 2025). Assessments can be automated with AI. Teachers can input their material into an AI chatbot and ask for a set of both formative and summative assessments that fully assess the student's abilities for that particular skill. And, while grades have been calculated through a Learning Management System for over two decades, AI gives teachers the ability to grade qualitatively, by inputting a rubric or similar guidelines and having the bot take over for the remaining grades. And not only can it figure out where student work fits on a rubric, it can also generate feedback that is tuned to the student at their exact level, and even in the voice that they'd prefer to hear it. Sorting students also becomes efficient and simple: create a spreadsheet with several different characteristics of your students and ask AI for whatever type of grouping is appropriate for the activity (random but homogenous, heterogenous but grouped by interest, personality type, etc.). Prediction about students, both their propensity to fail out of a course as well as what course or skill to work on next, is also easily dictated by machine. No longer do teachers need to use intuition with data; they can now rely solely on the machine's intuition about the data.

All these outputs count as transactional artifacts. The outputs are timestamped, standardized, and reproducible. They also travel well across the various LMS', dashboards, and reports that administrators use to track progress. Regardless of whether these systems produce good learning, they become very attractive to organizations. This is illustrated by the fact that some schools have already moved away from hiring teachers (they instead hire "guides") and are using AI to teach students means that proponents of this technology assume that students are self-directed ("AI Powered Private School," n.d.). The effort that goes into completing these assignments is smoothed. In a world where AI is used primarily as a teaching mechanism in place of teachers, there is no need for relational friction. But as we have seen, this creates equity concerns. In such a world, those who have the cultural capital to learn well from machines will flourish, and those who do not will flounder. AI gains authority in schools not because it understands students, but because its outputs can be easily understood by institutions.

# 7 Implications

I have so far explained how transactional teaching benefits those with cultural capital, and I have identified ways in which friction shows up organizationally. I will now discuss ways in which friction shows up in student learning. Friction implies a certain level of difficulty that is constitutive of learning. Consider the process of writing an essay, which is one of the most standard assignments that students are given in schools across the country. The process of writing an essay is one that is often seen as a means to an end. It is used often to show that students read and understood the passage of a book, or simply that they can follow the standard five paragraph format on any topic they want. Any grammatical revision comes in the form of red marks on the page and might easily be ignored or misunderstood by the student.

That is what an essay does on a transactional level. With a relational posture, writing an essay is the process of externalizing thought. This assumes that writing is thinking for students, and that the essay is not only a product, but a process as well. Embedded in the mechanism for understanding is delay, uncertainty, and revision. In this model of essay writing, cognitive friction becomes a condition for the learning. When the essay is turned into the teacher, another opportunity emerges for relational teaching, which is how the work is given feedback.

Feedback is inherently relational. It signals recognition, accountability, and expectation. While we have characterized transactional feedback (even if it is not AI generated) as being

more about correctness and closure, we will define relational feedback as a means of interpretation, calibration, exploration and continuity over time. Schools and EdTech companies may position this process as purely transactional because efficiency is the dominant evaluative criterion. But if student work is never read by a teacher, the relationship that motivates risk-taking and sustained effort never forms. Further, the student will not see the essay as a relational tool either; they will continue to see it as pure assessment or a point of closure. AI-generated feedback, on the other hand, is interactionally thin. It has no memory, no history, and no mutual accountability. It cannot take responsibility (Flenady & Sparrow, 2025). Therefore, it cannot accumulate relational capital. When friction is removed not only from organizational processes but from learning and feedback themselves, education shifts from a relational practice to a system of isolated task completion.

## 8 Boundaries and Limitations

Although this paper has delineated between two extremes (transactional and relational teaching), these constructs are analytical and do not always accurately reflect the reality of the classroom. In a real classroom, much emphasis is placed on the relationship between teachers and students, and there is much literature that has explored and has been used practically to improve relationship-building techniques between teachers and students. The argument presented here is about the dominance of transactional teaching and the sociological structures that keep this dominance in place. It is also a future-focused argument that extrapolates on the potential impact of AI technology in the classroom. With this in mind, I acknowledge the reality of most classrooms, which blend transactional and relational components.

This paper argues for a shift to more relationally based teaching by way of creating friction. However, friction may not always be the right tool. Many schools currently do not have the proper support to counter the frustration that students might feel in a relational teaching model. Frustration without support is not learning. A relationship cannot exist without multiple parties in the relationship playing their appropriate roles. Therefore, positioning the relational posture as an ideal within a system that does not have the proper supports for students may result in confusion and an untenable institution-level of frustration. My argument is not to maximize friction indiscriminately, but that relational teaching conditions friction. There are certainly a great number of tasks that each school or district must complete that would benefit from a smoothing process. For example, updating student records, or tracking student lunch expenditures, organizing the lunch/recess schedule, and other such menial tasks.

Additionally, I have not intended to imply that technology is detrimental to schools entirely. Technology has always shaped schooling, and without it, the quality of learning that exists today in schools would not be possible. In fact, some technologies can support relational work. In an asynchronous or hybrid course, for instance, students and teachers may communicate via message board or direct message. Video conferences are also possible when the two parties are not in the same location. This is especially important for higher education, where courses can be taken virtually and often the relationship is harder to maintain without frequent and intentional communication. This paper's critique of technology is about the organizational logics and not the tools themselves.

Another important consideration is the age of the student in question. What relational teaching looks like for a graduate level student compared to a Kindergartener is remarkably different, and this must be considered when developing institutional models. Still, the delineations made here are age-agnostic; even though the concept of feedback varies by age level, what it looks like is different when comparing early childhood to adult. Also, we must consider the subject in question. I used the example of writing an essay earlier, but one could apply the same logic to math problems. Again, feedback will look dif-

ferent as would the relationship between math student and math teacher. While LLMs are poor calculators, many other long-standing tools exist to break down math problems and explain the steps to students, so the arguments laid forth in this paper still apply. Reading, especially at the high school level, is deeply intertwined with writing; however, one must not discount the possibility of AI summarized text for an article or book to meet the transactional requirement of completing a comprehension quiz or other compliance check. Yet another context that is relevant is the institutional context. Elite and wealthy institutions might be in a better position to implement the type of structures that would support relationship-based learning. The argument advanced here concerns which forms of coordination are systematically rewarded, not which practices individual teachers value or enact.

## 9 Conclusion

Smooth schooling is not a neutral practice. It necessarily gives an advantage to those who can self-direct. Relational work, while currently common but not dominant in classrooms, is becoming increasingly rare in an education landscape that is mired in AI and other predictive algorithms.

Transactional teaching by way of smooth schooling also has the propensity to be a default choice for educational institutions, because of conformity and "best practices." It might further amplify inequalities among students, and the addition of AI into the EdTech repertoire will accelerate this process. Transactional teaching is currently organizationally rewarded, and the system that protects it makes it difficult to push against it or reject it. This paper does not argue that relational teaching guarantees, or that it eliminates inequality. Rather, it argues that relational teaching alters the conditions under which success is possible. It does this by reducing reliance on students' prior access to cultural and institutional resources.

This paper reframes dominant debates about AI in education away from questions of cheating or motivation and toward an analysis of coordination logics. In doing so, it gives analytic status to friction as a central mechanism in learning and teaching. If efficiency is no longer treated as the primary educational value, what kinds of educational systems become possible? What futures might emerge when relational work is recognized not as inefficiency, but as infrastructure?

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