Technological Opacity & Procedural Injustice

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TECHNOLOGICAL OPACITY & PROCEDURAL INJUSTICE

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TECHNOLOGICAL OPACITY & PROCEDURAL INJUSTICE

Seth Katsuya Endo*

Abstract: From Google’s auto-correction of spelling errors to Netflix’s movie suggestions, machine-learning systems are a part of our everyday life. Both private and state actors increasingly employ such systems to make decisions that implicate individuals’ substantive rights, such as with credit scoring, government-benefit eligibility decisions, national security screening, and criminal sentencing. In turn, the rising use of machine-learning systems has led to questioning whether they are sufficiently accurate, fair, and transparent. This Article builds on that work, focusing on how opaque technologies can subtly erode the due process norm of participation. To illuminate this issue, this Article examines the use of predictive coding—a form of technology-assisted review in which supervised machine-learning software is taught to predict the relevance of collected documents for discovery productions. The use of predictive coding in civil discovery highlights the new challenge to the participation norm because the processes generally do not provide any explanations for the outputs, much less non-technological accounts that are tied to the underlying substantive legal issues. Thus, even if predictive coding results in reasonably complete, accurate, and cost-efficient productions, the “black-box” nature of the process may harm the legitimacy that comes from litigants understanding and being able to more fully participate in judicial processes. This harm, however, has not been addressed by the developing jurisprudence, probably because most of the early cases involved high-stakes litigation between sophisticated parties who could afford computer experts. But the participation issue—and related equality con-
cerns—will become increasing problematic as the technology’s use expands beyond this privileged posture. In response to these issues, this Article proposes a reinvigorated Mathews framework that explicitly weighs predictive coding’s impact on the participation norm to better futureproof the doctrine.

INTRODUCTION

From Google’s auto-correction of spelling errors to Netflix’s movie suggestions, machine-learning systems are a part of our everyday life. These systems typically use software to “detect patterns in data[] and then use the uncovered patterns to predict future data[] or to perform other kinds of decision making under uncertainty.”¹ Both private and state actors increasingly employ machine-learning systems to make decisions that implicate individuals’ substantive rights, such as with credit scoring, government-benefit eligibility decisions, national security screening, probable cause determinations, and criminal sentencing.² In turn, the rising use of machine-learning systems has led to questioning about whether they are sufficiently accurate, fair, and transparent.³ This Article builds on that work, focusing on how opaque technologies can subtly erode the due process norm of participation.

This Article specifically examines the use of predictive coding—a form of technology-assisted review in which supervised machine-learning software...


is taught to predict the relevance of collected documents for discovery productions. The use of predictive coding in civil discovery highlights the new challenge to the participation norm particularly clearly because the processes generally do not provide any explanations for the outputs, much less non-technological accounts that are tied to the underlying substantive legal issues.

Furthermore, the emphasis on predictive coding in civil discovery is warranted because several factors suggest it will be used with increasing frequency. As computers—from desktops to smartphones—become ever more omnipresent, the amount of electronically stored information (ESI) continues to rise, creating significant logistical and cost challenges for civil litigants. In response to these complications, the 2015 amendments to Federal Rule of Civil Procedure 26(b) integrated a requirement that discovery be “proportional to the needs of the case” directly into the definition of its scope. Together, these developments present a risk that essential discovery in cases involving individual small-value claims against large defendants will be stifled, raising the need for a technological fix like predictive coding.

To make this more concrete, one might see the issues presented by the rise in ESI and the proportionality command arise in an employment discrimination suit brought by an individual against a multinational company. In such a case, the employee’s claim is worth comparatively little and the information about both the employee and his or her comparators that would potentially show discriminatory patterns may be contained in a large number of emails and human resources documents that are dispersed across a broad swathe of the company. The average corporate worker sends or receives more than one hundred emails per day. To exceed one hundred thousand documents, a case

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7 See Kevin E. Davis & Helen Hershkoff, *Contracting for Procedure*, 53 WM. & MARY L. REV. 507, 545 (2011) (emphasizing the need for robust discovery in employment discrimination cases); see also Bruce L. Hay, *Civil Discovery: Its Effects and Optimal Scope*, 23 J. LEGAL STUD. 481, 483–84 (1994) (illuminating the twin purposes of discovery through the example of an employment discrimination suit).

would only need to involve three supervisors emailing over a twelve-month period. Thus, one can imagine predictive coding being offered as a cost-effective answer to the proportionality inquiry in a challenge to the scope of discovery. In other words, predictive coding is a technological fix that might make the low-value employment discrimination claim viable.

Additionally, the use of predictive coding in legal processes is a particularly timely issue. In its various forms, predictive coding has received a great deal of attention from practitioners, the academy, and the public at large. At the same time, the use of predictive coding is still in its early stages and the jurisprudence remains mutable.

The existing academic literature and case law on the use of predictive coding in civil discovery have focused on its practical implementation, addressing (1) its accuracy and economic efficiency in culling voluminous ESI for responsive materials; (2) the application of Federal Rule of Evidence 702 and the U.S. Supreme Court’s 1993 holding in Daubert v. Merrell Dow Pharmaceuticals, Inc.; and (3) professional responsibility issues such as maintaining technological prowess, preventing unauthorized practice of law, or protecting attorney-work-product. This body of scholarship and law,
however, has neglected to consider both a key attribute and a following implication of most—if not all—predictive coding processes: they are not designed to provide easily intelligible explanations that rely on the substantive meaning of the materials. This deficit can negatively impact the due process norm of participation for litigants who lack the financial resources for computer experts.

So far, courts have primarily addressed the use of predictive coding in discovery in cases involving sophisticated, well-resourced litigants who were able to employ experts in the technology, sidestepping the intelligibility issue. But, this sort of privileged posture is not the standard in civil litigation as a whole. Thus, the jurisprudence does not necessarily raise all of the issues—whether going to practical implementation or higher normative values—with which the judiciary must ultimately wrestle in its managerial role.

Predictive coding’s lack of easy intelligibility implies that the process will require either the expense of experts or trust in a “black-box” process. To the former, regardless as to whether the procedural protections for the use of experts apply, the expense of experts could destroy the economic value of many small-value individual claims. To the latter, even if predictive coding results in more accurate and cost-effective productions, the “black-box” nature of the process may harm the element of legitimacy that comes from litigants understanding and being able to more fully participate in judicial

\[15\] See infra notes 62–249, 292–370, and accompanying text.


\[18\] Remus, supra note 10, at 1705.


processes—dimensions of efficacy wholly different than the accuracy and cost efficiency of a discovery production.21

Courts, however, have focused nearly exclusively on economic efficiency in their proportionality inquiries.22 If this doctrine calcifies, the resulting law will disadvantage plaintiffs with small-value claims and undermine the due process norm of participation. To rectify this and better futureproof this jurisprudence, courts should explicitly include the non-financial values of the parties’ understanding and participation in the courts’ MatheWS-style assessments of predictive coding’s cost and benefits in civil discovery.23

Part I of this Article briefly describes the relevant federal rules regulating civil discovery, their normative goals, and the standard doctrinal framework for discovery disputes. Part II provides a brief description of how predictive coding in civil discovery actually works, the reasons it is coming to the fore, and the jurisprudential landscape. Part III examines the dual-edged nature of predictive coding with a focus on the normative trade-off between accuracy and cost efficiency on one hand and knowledgeable participation on the other. The intervention it argues for is making courts explicitly include this trade-off in the cost-benefit weighing undertaken in their management of predictive coding. It also includes a short discussion of possible non-doctrinal solutions that could reduce the problematic elements of the trade-off such as technological or professional development advances that increase the transparency of the predictive coding processes. The Article concludes with a summary of the foregoing points and the broader lesson that can be drawn.

I. THE NORMATIVE GOALS, AND INCREASING SUBSTANTIVE RIGHT, OF CIVIL DISCOVERY

The first step in evaluating the evolving jurisprudence of predictive coding in civil discovery is to identify the normative goals that the relevant procedural rules are designed to achieve.24 Describing these goals provides the

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22 See infra notes 166–201 (describing cases discussing proportionality); see also Coleman, supra note 17, at 1007.

23 See Brooke D. Coleman, The Efficiency Norm, 56 B.C. L. REV. 1777, 1824 (2015) (noting the value in considering the litigants’ acceptance of the result); see also Mathews v. Eldridge, 424 U.S. 319, 323–49 (1976) (establishing the well-known balancing test for weighing due process interests); supra notes 55–61 and accompanying text.

measure by which a court—or other observer—should gauge the success of the emerging doctrine.25 Additionally, as applied in civil discovery, the underlying goals give the rules something approaching a constitutional dimension.26 And, at a high level, the existing doctrinal framework already attempts to balance a set of interests that include, at least, some of these goals.27

Rules 26 through 37 of the Federal Rules of Civil Procedure all speak to discovery and disclosure.28 Most disputes involving the use of predictive coding in civil discovery turn on the issue of scope.29 Accordingly, Rule 26(b)(1) is the most relevant provision. It states:

> Unless otherwise limited by court order, the scope of discovery is as follows: Parties may obtain discovery regarding any nonprivileged matter that is relevant to any party’s claim or defense and proportional to the needs of the case, considering the importance of the issues at stake in the action, the amount in controversy, the parties’ relative access to relevant information, the parties’ resources, the importance of the discovery in resolving the issues, and whether the burden or expense of the proposed discovery outweighs its likely benefit. Information within this scope of discovery need not be admissible in evidence to be discoverable.30

The text demonstrates the main objective highlighted in Rule 26 is proportionality, which is grounded in the listed constituent factors. This tends to turn into a question of economic efficiency with its subparts of accuracy and cost effectiveness.31 But the text of Rule 26 alone does not provide any interpretative guidance as to the weighting of these factors, much less as to any

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27 See, e.g., Moore, 287 F.R.D. at 189 (balancing the accuracy and comprehensiveness of a given discovery review method against its costs to determine its value relative to other review methods).
28 FED. R. CIV. P. 26–37.
29 See infra notes 292–370 and accompanying text.
other overarching norms that may apply.\textsuperscript{32} And, when considering both the structural role and institutional competence of the federal courts, it is not obvious that courts are the collective body best situated to generate the social objectives to be served by the procedural rules.\textsuperscript{33}

The Federal Rules of Civil Procedure, however, are not completely silent about the norms they aim to serve. Rule 1 describes the code’s broad purpose as being “to secure the just, speedy, and inexpensive determination of every action and proceeding.”\textsuperscript{34} This provides some statutory guidance as to the higher aspirations of civil procedure, which must inform the interpretations of the other rules.\textsuperscript{35}

As applied to discovery more specifically, Rule 1 has been understood as prohibiting unfair surprises, promoting an exchange of information sufficient for each side to assert their claims or defenses, and to avoid unnecessarily prolonged litigation.\textsuperscript{36} Notwithstanding these common formulations that focus on these fairly tactical objectives,\textsuperscript{37} the primary placement of the term “just” in Rule 1 suggests an emphasis on higher-level norms that extend beyond simply ensuring parties have material that might help them win their cases.\textsuperscript{38} This is in keeping with the history of the discovery rules, which were originally designed to permit liberal discovery with an eye towards providing parties with important information necessary to ultimately pursue a disposi-

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\textsuperscript{32} See Bernadette Bollas Genetin, “\textit{Just a Bit Outside!}”: Proportionality in Federal Discovery and the Institutional Capacity of the Federal Courts, 34 REV. LITIG. 655, 661 (2015) (suggesting an absence of normative guides in the procedural rules). As to the other goals, even the proportionality inquiry itself implicates a wider set of normative goals than just cost-efficiency. See \textit{infra} notes 292–370 and accompanying text.

\textsuperscript{33} See Genetin, \textit{supra} note 32, at 661 (concluding the social implications for bounding discovery may fall outside the scope of judicial expertise).

\textsuperscript{34} FED. R. CIV. P. 1.


\textsuperscript{37} See, e.g., Herbert v. Lando, 441 U.S. 153, 177 (1979) (describing the goal as “adequately informing the litigants in civil trials”); JAY E. GRENI\textsc{g} & JEFFREY S. K\textsc{in}sl\textsc{er}, HANDBOOK OF FEDERAL CIVIL DISCOVERY AND DISCLOSURE § 9:2, at 510–11 (3d ed. 2010); John S. Beckerman, Confronting Civil Discovery’s Fatal Flaws, 84 MINN. L. REV. 505, 534–35 (2000) (discussing the relationship between discovery and pleadings); Morgan, \textit{supra} note 12, at 76 (examining the speed of predictive coding).

\textsuperscript{38} FED. R. CIV. P. 1. This is, of course, not to imply that these pragmatic goals are unimportant or unrelated to the participation norm that is the focus of this Article. Nor is it meant to imply that these scholars and courts are not mindful of the normative questions.
tion on the merits of the case—that is, to give the parties a chance to be heard.\textsuperscript{39} Elaborating on these themes, scholars have articulated additional discovery-specific norms. For example, some scholars have described a truth-seeking function.\textsuperscript{40} Professor Martin Redish argues that the procedural rules regulating discovery should promote the following high-level goals: “(1) decisionmaking accuracy; (2) adjudicatory efficiency; (3) political legitimacy; (4) maintenance of the substantive-procedural balance; (5) predictability; and (6) fundamental fairness.”\textsuperscript{41} This articulation by Professor Redish echoes the concerns outlined in Professor Lawrence Solum’s seminal work on procedural justice, which identified participation and accuracy as the two main principles.\textsuperscript{42}

According to Professor Solum, the participation principle encompasses the benefits of process that are not reducible to either accuracy or cost.\textsuperscript{43} To ground these benefits, he posits that adjudicative processes are only legitimate if they afford an opportunity for participation from those who are bound to the decisions.\textsuperscript{44} Less abstractly, Professor Solum writes, “The right of participation is the right to observe, to make arguments, to present evidence, and to be informed of the reasons for a decision.”\textsuperscript{45}


\textsuperscript{40} E.g., Yitshak Cohen, The Issue of Document Disclosure in General Courts and in Family Courts: A New Model, 37 HOUS. J. INT’L L. 43, 60 (2015).

\textsuperscript{41} Redish, supra note 21, at 593.


\textsuperscript{43} Solum, supra note 42, at 275. At the same time, Professor Solum asserts that the participation principle does not rely on dignity, equality, or autonomy grounds. Id. at 286–90. But, even if one accepts this proposition, these values are still linked to participation. Id.; see also Robert G. Bone, Statistical Adjudication: Rights, Justice, and Utility in a World of Process Scarcity, 46 VAND. L. REV. 561 passim (1993).

\textsuperscript{44} Solum, supra note 42 at 279–80.

\textsuperscript{45} Id. at 280.
When thinking about how the participation norm plays out in ordinary discovery, the exchange of facts is both an expression of and a prerequisite for voice and information gathering.46 And typically, the sorting processes used in discovery—such as the use of keywords for screening documents—are causatively tied to the substantive law. This clear, intelligible link to the substance adds to the voice and information-gathering aspects of participation. Additionally, it contributes to the overall transparency of the reasoning involved in the court-superintended party decisions.

The accuracy principle conjectures that process choices should enhance the likelihood that the ultimate outcome of an adjudicative proceeding will be substantively correct.47 This applies to discovery because the information-exchange processes are meant to aid this instrumentalist purpose by giving each party—and, ultimately, the court—the information necessary to judge the case.48

Current accounts of procedural justice continue to expound upon Professor Solum’s two principles of participation and accuracy while also explicitly elevating cost efficiency.49 Cost efficiency is effectively embedded in the text of Rule 26, so, unsurprisingly, it has a central place in the new jurisprudence around predictive coding in civil discovery.50 But, the participation principle is going under-examined and under-emphasized—in contrast to accuracy and cost efficiency.

No matter which articulation of the elements of procedural due process one applies to discovery, all normative goals flow from a conception of procedural due process that is at the heart of the Federal Rules of Civil Procedure. Accordingly, to the extent that the discovery rules aid the ability of a party to present their claim in a manner that is fundamentally fair, they are imbued with an almost-constitutional weight.51

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46 See Hollander-Blumoff, supra note 21, at 154; Redish, supra note 21, at 600; Solum, supra note 42, at 268.
47 See Solum, supra note 42, at 306.
48 See supra notes 36–39 and accompanying text.
49 See Solum, supra note 42, at 275; see also Paul Stancil, Substantive Equality and Procedural Justice, 102 IOWA L. REV. 1633, 1649–51 (2017). Note also how these norms can be either reinforcing or in tension with each other. See, e.g., Geoffrey P. Miller, On the Costs of Civil Justice, 80 TEX. L. REV. 2115, 2118 (2002).
50 See supra notes 30–31 and accompanying text.
51 Curran, supra note 26, at 1141. In its operation, the discovery rules also might implicate individual constitutional rights. Miller, supra note 26, at 464. For example, Professor Arthur Miller has identified how the judiciary’s management of discovery processes can infringe on both privacy and property rights. Id. Additionally, the modern tradition of liberal, trans-substantive discovery should ultimately lead to the privileging of the goals of the underlying substantive law, which might involve constitutional rights. See Curran, supra note 26, at 1141. Finally, some scholars have argued that there is a more general constitutional root of civil procedure in the due
Scholars are not the only ones to identify the quasi-constitutional dimensions of civil discovery. For example, the United States Court of Appeals for the Third Circuit held that fundamental fairness was violated when a district court’s denials of letter rogatory requests under Rule 28 meant that the plaintiff had no ability to prove her case. Writing for the court, Judge A. Leon Higginbotham explained, “Due process mandates that a judicial proceeding give all parties an opportunity to be heard on the critical and decisive allegations which go to the core of the parties’ claim or defense and to present evidence on the contested facts.”

Ultimately, in assessing whether procedural rules—like those governing civil discovery—comply with the constitutional command of procedural due process, courts typically use the balancing test that was set forth in 1975 in *Mathews v. Eldridge*. In *Mathews*, the U.S. Supreme Court balanced the extent to which additional or alternative processes would prevent the erroneous deprivation of the private interest at stake against the costs to the government and adverse parties of adopting the proposed procedural safeguards. This test has been applied to processes available to private litigants in civil litigation.

Although a court might not explicitly identify its balancing of the interests at play in discovery disputes as a *Mathews*-style test, functionally, that is what happens in the predictive coding cases. Further illustrating both the pervasiveness and importance of this particular balancing inquiry in questions of civil procedure, the concerns about whether additional, potentially costly discovery processes were warranted can be seen underlying the U.S. Supreme process clauses of the Fifth and Fourteenth Amendments. See, e.g., John Leubsdorf, *Constitutional Civil Procedure*, 63 Tex. L. Rev. 579, 588 (1984).


See *infra* notes 166–201; see also Citron, *supra* note 2, at 1284.
Court’s 2007 and 2009 decisions in *Bell Atlantic Corp. v. Twombly* and *Ashcroft v. Iqbal*.  

The balancing test, as applied in *Mathews*, included all three elements of procedural justice described above: accuracy, cost-efficiency, and participation. Thus, the critical problem in the existing jurisprudence of predictive coding in civil discovery is not the general framework. Instead, the issue is that courts have effectively ignored the procedural justice requirement of meaningful participation.

In civil discovery, courts have primarily focused on whether the use of predictive coding is accurate and efficient. But the new wrinkle of predictive coding in civil discovery is that the processes frequently cannot provide explanations for their results that are tied to the underlying legal substance, if they can give an explanation at all. Explanations are a necessary component of the due process norm of participation. Taken together, this leads to the conclusion that courts should explicitly assess the damage done to the participation norm in their *Mathews*-style assessments of predictive coding’s cost and benefits in civil discovery.

II. OVERVIEW OF PREDICTIVE CODING IN CIVIL DISCOVERY

A. How Predictive Coding in Civil Discovery Actually Works

A basic understanding of the mechanics of how predictive coding in civil discovery actually works is vital to evaluating the jurisprudential ramifications of its use. This section provides a short primer on this, focusing on the technologies that are used in civil litigation. As part of this, it discusses how

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predictive coding processes are both less transparent and less tied to the underlying substantive meaning of the documents than earlier search techniques.

Although the term “predictive coding” appears frequently in the case law, academic literature, and vendor promotional material, its meaning must still be pinned down.64 Myriad discovery vendors—including some prominent legal-industry players such as FTI, kCura (Relativity), Recommind, and Symantec—provide predictive coding processes.65 But the offerings vary significantly.66 For the purposes of this Article, the term “predictive coding” refers to review processes that use supervised machine-learning algorithms to categorize material based on experts’ coding of training sets of documents.

More concretely, a typical predictive coding process would generally entail the following steps.67 First, an initial training set of documents (referred to as a “seed set”) is either randomly or deliberately selected. Next, a subject-matter expert codes the documents for a particular attribute or set of attributes (in civil discovery, relevance is the typical category). Computer software uses the coded seed set to generate a model that is designed to predict the likelihood that other documents have the sought attributes based on shared fea-

64 See Grossman-Cormack Glossary, supra note 63, at 6; see also Shannon Brown, Peeking Inside the Black Box: A Preliminary Survey of Technology Assisted Review (TAR) and Predictive Coding Algorithms for eDiscovery, 21 SUFFOLK J. TRIAL & APP. ADVOC. 221, 239 (2016). The Grossman-Cormack Glossary defines “predictive coding” as: “An industry-specific term generally used to describe a Technology-Assisted Review process involving the use of a Machine Learning Algorithm to distinguish Relevant from Non-Relevant Documents, based on Subject Matter Expert(s)’ Coding of a Training Set of Documents.” Grossman-Cormack Glossary, supra note 63, at 26. This definition, however, has been criticized for being too specific in restricting the sorting to relevant and non-relevant. Brown, supra note 64, at 262. Conversely, others have suggested additional elements, asserting that “predictive coding” must meet all of the following: (1) “Integrated, keyword-agnostic analytics to quickly generate accurate seed sets”; (2) “Language and keyword-agnostic machine-learning technology to accurately find relevant documents during the ‘training’ process”; (3) “A sound and well-documented workflow”; (4) “Integrated sampling to verify results to a statistical certainty before, during and after review”; and (5) “A completely integrated, purpose-built system to ensure results are consistent throughout the entire process, every time.” Sharon D. Nelson & John W. Simek, Predictive Coding: A Rose by Any Other Name, L. PRAC., July–Aug. 2012, at 22.


67 The description of the general process comes from discussions with e-discovery experts, vendor promotional material, and descriptions in many of the academic sources cited throughout this Article. See, e.g., Remus, supra note 10, at 1701–02; see also EDISCOVERY INST., EDISCOVERY INSTITUTE SURVEY ON PREDICTIVE CODING (2010), http://www.discovia.com/wp-content/uploads/2012/07/2010_EDI_PredictiveCodingSurvey.pdf [https://perma.cc/2MRN-DUAY].
The model is then applied to uncoded documents, scoring each one. Next, a subject-matter expert reviews these results and the model is revised based on the new input. A final human review or statistical validation is frequently the final step before production.

Functionally, all of the models’ methods are ways to find similarities that allow for categorization and scoring based on various inputs such as keywords or custodians. At this level of abstraction, they do not appear so different than human legal reasoning, which generally takes the form of analogizing. And, implicitly assuming this similarity, the general rules of discovery have been imported to this new context. In this vein, the Sedona Conference has argued that courts should not impose greater transparency and validation requirements on predictive coding discovery processes (as compared to traditional methods) because the new technologies have generally demonstrated their reliability in the end productions. But a key difference is that even sophisticated legal entities likely require expert assistance in interpreting how the new technologies work in predictive coding.

For the more sophisticated predictive coding products (and more generally in the wider universe of similar machine-learning algorithms), the machine-generated correlations do not privilege intelligible explanations that explain the relationship to the substantive legal issues. To the contrary, the tendency is for effective models to become so complex that even the original

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68 The methods used to develop the models—and the models themselves—can take many forms. Barry, supra note 66, at 355; Daniel Martin Katz, *Quantitative Legal Prediction—or—How I Learned to Stop Worrying and Start Preparing for the Data-Driven Future of the Legal Services Industry*, 62 EMOHY L.J. 909, 946 (2013). For example, some predictive coding processes use logistic regression, which finds a best-fit line to separate different classes of points. Brown, supra note 64, at 266. Others might employ support vector machines, which draw a separating hyperplane with margins that provide a buffer. *Id.* at 270–71; Grossman-Cormack Glossary, supra note 63, at 31. Also used are Bayesian algorithms, which estimate statistical probabilities that are based on observed prior outcomes. Brown, supra note 64, at 274–76; Grossman-Cormack Glossary, supra note 63, at 9. While the preceding methods do not comprise an exhaustive list, they illustrate some of the mechanisms that underlie more robust predictive coding processes.

69 *Id.* at 954–55.

70 See Redish, supra note 21, at 571–74.


73 Katz, supra note 68, at 950 & n.198. This issue—that is, the lack of a substantive tie—has been examined in other contexts, such as credit scoring. See, e.g., Hurley & Adebayo, supra note 1, at 151 (discussing a credit card company’s unwillingness to explain their rationale for slashing a consumer’s credit limit).
programmers may not be able to explain the mechanics that led to the output.\footnote{Rich, supra note 2, at 886; see also Andrea Roth, Trial by Machine, 104 GEO. L.J. 1245, 1271 (2016) (discussing “black box” concerns in the criminal context); Zeynep Tufekci, Algorithmic Harms Beyond Facebook and Google: Emergent Challenges of Computational Agency, 13 COLO. TECH. L.J. 203, 208–09 (2015) (contrasting presentation of information from traditional print media with Facebook news feed algorithms).} And enhancing intelligibility can require a reduction in the complexity—and accuracy—of these processes.\footnote{Tal Z. Zarsky, Transparent Predictions, 2013 U. ILL. L. REV. 1503, 1520.} But, as Professor Daniel Martin Katz puts it, the operative question has simply been, “Can your model predict better than the leading existing approach?”\footnote{Katz, supra note 68, at 949–50; see also Yablon & Landsman-Roos, supra note 12, at 652.}

This Article posits the importance of an additional question: Does your model provide intelligible, non-technical explanations that are tied to the underlying legal issues? In an exhaustive manual review, at least theoretically, a requesting party could seek explanations from the producing attorneys that would presumably be justified by a causative relationship to the legal issues in the case.\footnote{See George M. Cohen, The Multilawyered Problems of Professional Responsibility, 2003 U. ILL. L. REV. 1409, 1442 (discussing vicarious liability between lawyers, which creates a chain of responsibility that links a client to the attorneys doing the work even, for example, in a context in which contract attorneys are engaged in voluminous discovery tasks); Cassandra Burke Robertson, A Collaborative Model of Offshore Legal Outsourcing, 43 ARIZ. ST. L.J. 125, 174–76 (2011) (describing methods for promoting client accountability even when legal work is outsourced).} And the attorneys are able to draw on their perspectives and understanding that might extend beyond the case contours and previously reviewed documents.\footnote{Yablon & Landsman-Roos, supra note 12, at 663.} In this way, humans are probably better at dealing with unique or novel issues.\footnote{See supra notes 67–74 and accompanying text; see also Benjamin H. Barton, The Lawyer’s Monopoly—What Goes and What Stays, 82 FORDHAM L. REV. 3067, 3072 (2014) (suggesting rapid, accurate outputs, rather than discernible methods, are the principle virtue of technology in law).} Likewise, Boolean and keyword searches generally involve—and, certainly, permit—negotiations in which the review instructions are tied to the legal issues.\footnote{Id.} But, once the training sets have been coded, predictive coding models lack these characteristics—that is, the ability to discuss how the mechanisms are tied to the substance of the case, particularly if the connections present a novel relationship.\footnote{Id.} Instead, the models rely on complex mechanisms that require technical expertise to unpack.\footnote{This, of course, is not a problem that only arises in the context of predictive coding—but the financial inequities are exacerbated with this sort of opaque, highly complex technology.} The most explanation one
would expect to see from predictive coding software would be the weight table—that is, the correlative value of specific document features—that the model identified and employed. Accordingly, even though predictive coding should not be held to a higher standard than other review processes as to output, it raises different questions about how the process itself is developed and managed.

B. Factors Contributing to the Increasing Prevalence of Predictive Coding in Civil Discovery

Since its first court approval five years ago, the use of predictive coding in civil discovery has rapidly grown. The factors contributing to this growth suggest the prevalence will continue to increase, spreading to cases involving less sophisticated parties than those who have used it to date. This section first describes the rise of predictive coding in case mentions and survey results. It then discusses the interrelated factors leading to the increase: the growth of ESI, lawyers’ gamesmanship in civil discovery, the proportionality amendment to the Federal Rules of Civil Procedure, and technological innovation.

In February 2012, Magistrate Judge Andrew Peck was the first federal judge to approve the use of predictive coding in a written decision, bringing attention to the practice and ushering in its use. Three more orders addressing predictive coding appear in Westlaw’s 2012 case database. Six orders show up in the 2013 case database. Eleven orders are found in the 2014 da-

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86 SEDONA CONF., supra note 72, at 31–34; cf. Moore, 287 F.R.D. at 191 (discussing development and management of the keyword search process).

87 Moore, 287 F.R.D. at 192.


There was a slight dip in discovery orders in the 2015 database back to the 2013 level. But this might be due to a decline in the need for judicial discussion, which might follow from the growing pervasiveness of predictive coding’s use in practice.

Surveys of legal practitioners confirm the increasing use of predictive coding in civil discovery. For example, in a 2013 survey of large American law firms, 62% reported using predictive coding and 71% increased their use in the prior year. Demand was even stronger with 81% of responding firms reporting client requests for the tool.

A 2015 survey of federal agency attorneys, paralegals, records managers and IT professionals showed similar trends. The survey found that 27% of


92 A PACER docket search for the term “predictive coding” returned forty-five appearances in thirty-three cases from the same year.


94 Id.

respondents used predictive coding in 2015. This was a slight increase from 23% in 2014, 17% in 2013, and 6% in 2012.96

More survey data showed 55% of responding legal practitioners identifying predictive coding as a strategy that they will use to “manage eDiscovery volume, cost, and risk in the next six to twelve months.”97 Only 10% of respondents said that they did not ever use predictive coding in civil discovery.98 The majority of respondents (52%) used predictive coding in up to 20% of their cases.99 At the high end, 6% of respondents used predictive coding in over 80% of their cases.100

Although this Article focuses on domestic federal practice, predictive coding is part of a global trend. For example, in February 2016, the High Court of England and Wales approved the use of predictive coding for the first time, highlighting its potential accuracy and efficiency benefits.101 Vendors are even adapting predictive coding software to deal with logographic languages.102

1. Growth of Electronically Stored Information

The increased use of predictive coding is driven, in significant part, by the growth of ESI.103 More digital information has been created in just the past few years than existed in all human history before.104 The growth rate is

96 Deloitte Survey Reveals Government Officials Confident About E-Discovery Skills, supra note 95.
98 Id.
99 Id.
100 Id.
103 Peck, supra note 4, at 3.
104 Natalie M. Banta, Death and Privacy in the Digital Age, 94 N.C. L. REV. 927, 928 (2016).
estimated at about forty percent per year. This means the amount of digital information is virtually doubling every two years.

By 2020, the amount of digital data in the world is expected to reach forty-four zettabytes of data. To provide context for these numbers, this is more than six hundred times the amount of data in every published book in history. Perhaps less abstractly, each gigabyte (one trillionth of a zettabyte) could equal tens of thousands of printed pages. As Magistrate Judge Peck put it, “[t]he amount of digital information that is created everyday is staggering, and many companies preserve almost everything.”

This dramatic increase in ESI has had a profound impact on civil discovery practices. The sheer volume has obsoleted the traditional methods of discovery, which were effective for dealing with paper documents. Instead, new technological solutions—such as predictive coding—have been brought to the fore.

This growth in ESI has made discovery commensurately more expensive. A 2012 study found that production costs on a per gigabyte basis averaged around $18,000. Of particular relevance to a discussion of predictive coding, review costs contributed 70% or more to the total amount in more than half of the cases. To do this review, client companies reported using attorneys whose rates ranged from $40 to $70 for temporary contract

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105 COWEN GRP., supra note 93.
106 Id.; see also Banta, supra note 104, at 928.
108 See id. 
111 PECK, supra note 3.
112 PECK, supra note 3.
113 ERNST & YOUNG LLP, INSIDERS’ GUIDE TO TECHNOLOGY-ASSISTED REVIEW (TAR) 1 (2015); Peck, supra note 4, at 3.
114 ERNST & YOUNG LLP, supra note 111, at 1.
115 Amii N. Castle, Ready, Set . . . Proportionality! Preservation of Electronically Stored Information Under the Proposed Amended Federal Rules of Civil Procedure, J. KAN. B. ASS’N, June 2015, at 16, 17–18. Though the cost of discovery is noted as a concern throughout this Article, there are ways in which the scope and cost of discovery also have salutary side effects, such as creating a greater potential settlement zone and creating a cross-party investment in a pool of mutually shared information. See Samuel Issacharoff, The Content of Our Casebooks: Why Do Cases Get Litigated?, 29 FLA. ST. U. L. REV. 1265, 1271–72 (2002).
117 Id. at 25.
attorneys and up to $300 for a higher-priced firm that might only do a second-pass review.\textsuperscript{116}

As the surge in ESI has increased the costs of discovery, it has increased the opportunity for lawyers to strategically use discovery tactics as an exercise of gamesmanship.\textsuperscript{117} And this development, in turn, contributes to the rising prevalence of predictive coding.

2. Lawyers’ Gamesmanship

In addition to directly encouraging the use of predictive coding, the growth in ESI has aggravated the issue of gamesmanship in civil discovery.\textsuperscript{118} Although the extent to which abusive discovery practices are common is debated,\textsuperscript{119} such conduct can contribute to costs and delays in litigation—two of the concerns that predictive coding is meant to address.\textsuperscript{120}

The original vision of the drafters of the Federal Rules of Civil Procedure was that discovery would be a self-regulating process.\textsuperscript{121} This vision depended on the assumption that a common interest in reciprocal courtesy would lead litigants and their attorneys to cooperate.\textsuperscript{122} And, with this understanding, the original 1938 Rules did not include many provisions for court

\textsuperscript{116} Id. at 26.
\textsuperscript{117} FED. R. CIV. P. 26(b) advisory committee’s note to 2015 amendment (“The 1993 Committee Note further observed that ‘[t]he information explosion of recent decades has greatly increased both the potential cost of wide-ranging discovery and the potential for discovery to be used as an instrument for delay or oppression.’ What seemed an explosion in 1993 has been exacerbated by the advent of e-discovery.”); see also Beckerman, supra note 37, at 518–20.
\textsuperscript{118} John H. Beisner, Discovering a Better Way: The Need for Effective Civil Litigation Reform, 60 DUKE L.J. 547, 550 (2010); Remus, supra note 10, at 1693.
\textsuperscript{119} See EMERY G. LEE III & THOMAS E. WILLGING, FED. JUSTICE CTR., ATTORNEY SATISFACTION WITH THE FEDERAL RULES OF CIVIL PROCEDURE: REPORT TO THE JUDICIAL CONFERENCE ADVISORY COMMITTEE ON CIVIL RULES 1 (2010), https://www.fjc.gov/sites/default/files/2012/CostCiv2.pdf [https://perma.cc/AZN4-3YVD] (“The statement, ‘Discovery is abused in almost every case,’ elicited more disagreement than agreement from the ACTL fellows and ABA Section plaintiff attorneys, and more agreement than disagreement from NELA members and other ABA Section members.”). Compare Beckerman, supra note 37, at 507 (discussing a report that asserted, “[e]mpirical research has not produced evidence of widespread abuse of discovery.”), with Victor Marrero, The Cost of Rules, the Rule of Costs, 37 CARDOZO L. REV. 1599, 1692 & n.120 (2016) (describing the general agreement that law firm business practices add to unnecessary expense in discovery).
\textsuperscript{120} Remus, supra note 10, at 1693; see also ACF Indus., Inc., Carter Carburetor Div. v. E.E.O.C., 439 U.S. 1081, 1086 (1979) (Powell, J., dissenting) (“The decision of the Court of Appeals in this case not only appears to be inconsistent with our recent decisions, but also could discourage efforts to curb the widespread abuse of discovery that is a prime cause of delay and expense in civil litigation.”).
\textsuperscript{121} Beckerman, supra note 37, at 513.
\textsuperscript{122} Id. at 515–16.
management of the discovery process, anticipating that it would only be required in very exceptional cases.123

A number of factors, however, have made discovery more adversarial and, ultimately, costly than anticipated by the drafters of the original rules. For example, the general nature of litigation is adversarial with a consistent perception that client loyalty and combativeness are linked.124 And, as Professor Arthur Miller pithily explained, “The vision that adversarial tigers would behave like accommodating pussycats throughout the discovery period, saving their combative energies for trial, has not materialized.”125 To the contrary, “[p]arties hotly contest discovery and pre-trial practice at least in part because everyone knows that reaching a jury depends on the success of fact-gathering and procedural maneuvers.”126 Moreover, the processes for adjudicating disputes and potential penalties also do not provide efficient disincentives for bad behavior.127 This is exacerbated by judges’ general antipathy for policing such disputes.128 At the same time, the growth of the legal profession has decreased the likelihood of repeat interactions between lawyers, which reduces the game-theory incentives for cooperation.129 And this all happens in a world of increasingly large and complex federal cases.130

The incentives for litigants skew towards seeking too much material because of the interaction of information asymmetries and cost placement—i.e., the requesting party does not know what a request will turn up and the burden for production falls on the producing party.131 Judges take an especially critical view of this practice, identifying as the chief form of discovery abuse.132

125 Arthur R. Miller, The Adversary System: Dinosaur or Phoenix, 69 MINN. L. REV. 1, 15 (1984); see also Herbert v. Lando, 441 U.S. 153, 179 (1979) (Powell, J., concurring) (“As the years have passed, discovery techniques and tactics have become a highly developed litigation art—one not infrequently exploited to the disadvantage of justice.”).
127 Id.; see also Nelson, supra note 124, at 797.
128 Beckerman, supra note 37 at 520.
129 Id. at 519–20.
130 Id. at 543–59; Frank H. Easterbrook, Discovery as Abuse, 69 B.U. L. REV. 635, 641 (1989); Hollander-Blumoff, supra note 21, at 155–56; Thomas C. Tew, Electronic Discovery
Additionally, litigants can use discovery requests to force settlement when a producing party’s costs of complying with its discovery obligations are greater than the requested relief.133 Illustrating these distorted incentives, “e-discovery trolls” have appeared.134

The producing party might also engage in gamesmanship that results in over production. For example, a litigant might engage in a “data dump” in which it seeks to overwhelm the requesting party with material.135 Despite the general information asymmetries and financial elements of litigation, which mean the defendant is more frequently the party who has more discoverable material and resources,136 plaintiffs can also engage in this sort of discovery abuse.137

Additionally, parties might engage in discovery that is designed to embarrass their opponents. For example, a party might pose personal, intrusive questions to their adversary.138

Regardless of form,139 abusive discovery tactics lead to disputes, which make the litigation process more expensive for litigants.140 And the increase in costs is one of the main factors driving the adoption of predictive cod-

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133 Karel Mazanec, Note, Capping E-Discovery Costs: A Hybrid Solution to E-Discovery Abuse, 56 WM. & MARY L. Rev. 631, 645 (2014); cf. Chrysler Corp. v. Miller, 450 So. 2d 330, 331 (Fla. Dist. Ct. App. 1984) (discussing the court’s discomfort in cases where the value of the suit is eclipsed by the cost of discovery).
135 Hollander-Blumoff, supra note 21, at 155–56; Losey, supra note 9, at 54–55 & n.192.
136 FED. R. CIV. P. 26(b) advisory committee’s note to 2015 amendment; Emily Chiang, Institutional Reform Shaming, 120 Pa. St. L. Rev. 53, 105–06 (2015); Moore, supra note 6, at 1132.
140 Beckerman, supra note 37, at 517; Judges’ Opinions on Procedural Issues, supra note 132, at 733.
Moreover, court interventions bring in the issue of judicial legitimacy.\textsuperscript{141} In response to the challenges raised by the increase in discoverable material, lawyers’ gamesmanship, and the interaction between the two, there has been a procedural shift towards more judicial management as reflected in amendments to the Federal Rules of Civil Procedure.\textsuperscript{143}

For example, in 1980, subdivision (f) was added to Federal Rule of Civil Procedure 26, entitling counsel to the assistance of the court in discovery planning.\textsuperscript{144} Three years later, judges were given additional powers to both proactively manage the discovery process and to sanction attorneys.\textsuperscript{145} In 1993, the Federal Rules of Civil Procedure were amended to introduce affirmative initial disclosures that must be made even without a formal discovery request.\textsuperscript{146} And, in the same year, pre-discovery planning conferences also

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\item[141] Sara Metzler, Current Development, Moving Discovery Forward in the Technology Age, 29 GEO. J. LEGAL ETHICS 1153, 1159 (2016).
\item[142] Remus, supra note 10, at 1693; see also Matthew Young, Comment, To Cure the E-Discovery Headache, Revamp the Rule 26(f) Discovery Conference, 12 NW. J. TECH. & INTELL. PROP. 355, 363–67 (2014).
\item[143] See e.g., Facciola & Favro, supra note 14, at 3–4 (“That was certainly the case after the amendment cycles that ended in 1993 and 2006. In each instance, the sheer growth of electronically stored information (‘ESI’), among many other things, threatened to overwhelm the legal system with potentially discoverable materials.”). See generally FED. R. CIV. P. 26(b) advisory committee’s note to 2015 amendment (“The present amendment again reflects the need for continuing and close judicial involvement in the cases that do not yield readily to the ideal of effective party management.”); Kenneth J. Withers, E-Discovery and Combative Legal Culture: Finding a Way out of Purgatory, 2009 ANN. AM. ASS’N JUST. PAPERS 5 (2008). These movements for change and reform are not new. For example, in 1976, Chief Justice Warren Burger convened a national conference to examine whether Dean Roscoe Pound’s criticisms about judicial process at the start of the century had been answered by the development of the federal procedural rules, resulting in a new round of proposed reforms. William H. Erickson, The Pound Conference Recommendations: A Blueprint for the Justice System in the Twenty-First Century, 76 F.R.D. 277, 279 (1978); see also Brazil, supra note 124, at 1298–303 (noting the original intent of the procedural rules was to reduce adversarial posturing in the pre-trial phase); Subrin, supra note 36, at 743 (discussing solutions to the challenge of the judicial role in discovery). And, more generally, the move to a more managerial role for judges has been widely discussed in the academic literature. See, e.g., Steven S. Gensler, Judicial Case Management: Caught in the Crossfire, 60 DUKE L.J. 669, 670–71 (2010); Robert F. Peckham, The Federal Judge as a Case Manager: The New Role in Guiding a Case from Filing to Disposition, 69 CAL. L. REV. 770, 770 (1981); Judith Resnik, Managerial Judges, 96 HARV. L. REV. 374, 380 (1982).
\item[144] FED. R. CIV. P. 26(b) advisory committee’s note to 1980 amendment; Hiro N. Aragaki, Constructions of Arbitration’s Informalism: Autonomy, Efficiency, and Justice, 2016 J. DISP. RESOL. 141, 169 n.112.
\item[145] FED. R. CIV. P. 26(b), (f) advisory committee’s note to 1983 amendment.
\item[146] FED. R. CIV. P. 26(a) advisory committee’s note to 1993 amendment; Withers, supra note 143, at 5; see also Remus, supra note 10, at 1724 n.21; William W. Schwarzer, The Federal Rules, the Adversary Process, and Discovery Reform, 50 U. PITT. L. REV. 703, 721 (1989).
\end{footnotesize}
were added. 147 In 2000, both of these amendments were made uniform throughout the federal system. 148 The 2000 amendments also modified the limits of discovery, absent a showing of good cause, from any matter “relevant to the subject matter involved in the action” to those “relevant to any party’s claim or defense.” 149 In 2006, the term “electronically stored information” was added to Federal Rule of Civil Procedure 26 to make clear that this sort of material was encompassed by the rules and that the courts would enforce this understanding. 150 Most significantly for the purposes of this Article, in 2015, a direct proportionality limitation to discovery was added to Federal Rule of Civil Procedure 26. 151

3. Proportionality Amendment to the Federal Rules of Civil Procedure

In 2015, the definition of the scope of discovery permitted under Federal Rule of Civil Procedure 26(b) was amended to require that the sought material be “proportional to the needs of the case.” 152 Although the Advisory Committee notes to the rule disclaim any substantive change to the scope of discovery, they acknowledge that the amendment is meant to bring the issue of costs more to the fore. 153 This marks a move away from the previous dominant discovery goal of comprehensiveness. 154 Additionally, this has raised concerns that necessary discovery will be stifled in cases involving small-value claims. 155 Explaining these elements, some scholars have hypothesized that the effect of the proportionality amendment will be to focus the courts on costs and, perhaps, shift the burden to the requesting party. 156

147 FED. R. CIV. P. 26(a), (f) advisory committee’s note to 1993 amendment; Withers, supra note 143, at 5; see also Remus, supra note 10, at 1724 n.21; Schwarzer, supra note 146, at 721.
148 FED. R. CIV. P. 26(a), (f) advisory committee’s note to 2000 amendment; FED. R. CIV. P. 26(a), (f) advisory committee’s note to 1993 amendment; Withers, supra note 143, at 5; see also Remus, supra note 10, at 1724 n.21; Schwarzer, supra note 146, at 721.
149 FED. R. CIV. P. 26(b) advisory committee’s note to 2000 amendment; Aragaki, supra note, 144 at 169 n.112.
150 FED. R. CIV. P. 26(a) advisory committee’s note to 2006 amendment.
151 FED. R. CIV. P. 26(b) advisory committee’s note to 2015 amendment.
152 Id.; FED. R. CIV. P. 26(b)(1).
153 FED. R. CIV. P. 26(b) advisory committee’s note to 2015 amendment (“The present amendment restores the proportionality factors to their original place in defining the scope of discovery. This change reinforces the Rule 26(g) obligation of the parties to consider these factors in making discovery requests, responses, or objections.”).
154 Remus, supra note 10, at 1717–18.
155 See Burbank & Farhang, supra note 6, at 1593; see also Moore, supra note 6, at 1112–13; Sarah Staszak, Procedural Change in the First Ten Years of the Roberts Court, 38 CARDOZO L. REV. 691, 696–97 (2016) (noting the disadvantage of individual plaintiffs).
156 E.g., Moore, supra note 6, at 1116.
In response, many commentators—including judges, practitioners, and academics—have suggested that predictive coding might ameliorate that potential harm.157 The relationship follows from predictive coding’s ability to reduce review costs.158 Additionally, the non-binary scoring component allows parties to scale and stage their review and production.159 The upshot is that predictive coding can be a highly effective tool for enabling “the producing party to provide the requesting party with the most bang for the buck.”160

4. Technological Innovation

It is easy to forget how much technology has changed the world and the legal profession in a fairly short time.161 But the increased use of predictive coding in civil discovery naturally is also driven by the general advances in technology, which are altering how lawyers practice.162 This is part of a broader trend of similar developments such as the use of keyword searches and de-duplication.163 Decreased computing costs, which make the use of computer technology—including predictive coding—more economically efficient and spur uptake, contribute too.164 And the growth in use of predictive

157 See, e.g., Theodore C. Hirt, The Quest for “Proportionality” in Electronic Discovery: Moving from Theory to Reality in Civil Litigation, 5 FED. CTTS. L. REV. 171, 176–77 (2011) (noting the Sedona Conference principles state, “[t]echnologies to reduce cost and burden should be considered in the proportionality analysis”); Losey, supra note 9, at 54–55; Peck, supra note 4, at 3 (“While new technologies and ESI sources have added to the volume and cost of discovery, technology also offers solutions.”); Bay, supra note 9.

158 Losey, supra note 9, at 54 (“The use of the latest AI-based review technologies can significantly reduce these costs as shown, and for this reason alone predictive coding is the best tool we have for proportionality.”).

159 Id. at 55.

160 Id. at 54 (emphasis omitted).


163 Remus, supra note 10, at 1698.

coding itself adds to economies of scale, improved service quality, and increased user comfort.\(^{165}\)

**C. Court Implementation of Predictive Coding in Civil Discovery**

1. Timeline of Significant Cases

Having examined the structural factors driving the increasing use of predictive coding, this Article now turns to the existing case law. The section begins with a chronology of cases that contain more robust discussions of transparency and participation. It then synthesizes the holdings to identify the nascent doctrine.\(^{166}\)

In 2011, Magistrate Judge Peck of United States District Court of the Southern District of New York outlined the benefits of predictive coding in an article, implicitly inviting a court to approve its use in civil discovery.\(^{167}\) Several months later, he accepted his own invitation.\(^{168}\) In *Moore v. Publics Groupe*, five female employees brought an employment discrimination suit against Publicis Groupe and its subsidiary, MSL Group, under federal and state statutes.\(^{169}\) The parties could not agree on how to use predictive coding to “‘cull down’ the approximately three million electronic documents” from the designated custodians.\(^{170}\)

In its order on the issue, the district court covered a number of issues that helped define the emerging doctrine. First, it rejected the plaintiffs’ argument that Federal Rule of Civil Procedure 26(g) prohibited the defendants’ from certifying the production as “complete” if it was not definitively exhaustive, noting that the subsection incorporates a proportionality requirement.\(^{171}\) Second, the district court held that neither Federal Rule of Evidence 702 nor the *Daubert* expert-qualification framework applied to discovery search methods, limiting those procedural protections to evidence submitted to a jury at trial.\(^{172}\) Third, the district court deferred ruling on the plaintiffs’

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\(^{165}\) See Mitchell London, *Resolving the Civil Litigant’s Discovery Dilemma*, 26 GEO. J. LEGAL ETHICS 837, 856 (2013) (suggesting that as more courts facilitate the use of TAR, costs will decrease as quality increases).


\(^{168}\) Moore, 287 F.R.D. at 182–83.

\(^{169}\) Id. at 183.

\(^{170}\) Id. at 184.

\(^{171}\) Id. at 188.

\(^{172}\) Id. at 188–89.
objection that the defendants’ methods did not provide confidence that the results would be accurate, opting to wait until more information was available about the actual results.\footnote{Id. at 189.}

The district court in Moore then offered “further analysis and lessons for the future” on issues that were not directly raised by the parties’ dispute.\footnote{Id. at 189–93.} Starting with the proposition that the objective of e-discovery is “identify as many relevant documents as possible, while reviewing as few non-relevant documents as possible,” the court discussed predictive coding’s relative accuracy, finding that it performed better—and at lower relative costs—than alternative methods such as keyword searches.\footnote{Id. at 189–92.} It also stated that the defendants’ willingness to share the full seed set—including all non-privileged documents regardless as to whether they were coded relevant—to the plaintiffs contributed to the court’s approval of the process because it allayed concerns about the potential black-box aspect of the technology.\footnote{Id. at 192.} Additionally, the district court discussed the benefits of staging discovery.\footnote{Id.} Finally, it noted that the parties’ e-discovery vendors attended and participated in the hearings, which assisted the decision by providing additional technical insight into the process.\footnote{Id. at 193.}

In the following months, several other courts dealt with predictive coding issues in orders.\footnote{E.g., Kleen, 2012 WL 4498465, at *5 (describing how the court guided the parties towards a compromise where the plaintiffs had sought to compel the defendants to redo discovery searches using predictive coding instead of keyword searches because their experts disagreed on the accuracy of the techniques); EORHB, 2013 WL 1960621, at *1 (withdrawing its October 2012 \textit{sua sponte} order that the parties use predictive coding—and the same vendor—after the parties agreed that the cost was too high given the number of documents); Glob. Aerospace Inc. v. Landow Aviation, No. CL 61040, 2012 WL 1431215, at *1–2 (Va. Cir. Ct. Apr. 23, 2012) (permitting, for the first time, a defendant to use predictive coding over the objections of the plaintiff).} Of particular relevance, in \textit{In re Actos (Pioglitazone) Products Liability Litigation}, the district court judge approved the parties’ agreement to use predictive coding where the plaintiffs were provided with technical training for the predictive coding software and the parties worked together to code the seed sets.\footnote{Actos, 2012 WL 7861249, at *4.}
advisory functions.\textsuperscript{181} The court also noted the importance of party cooperation.\textsuperscript{182}

In 2014, other courts more directly addressed how cooperation and transparency impact their decisions. For example, in \textit{Bridgestone Americas, Inc. v. International Business Machines Corp.}, the district court permitted the plaintiff to use predictive coding because the full seed set was offered to the defendant, which had technical expertise with "big data."\textsuperscript{183} Likewise, in 2014 in \textit{Progressive Casualty Insurance Co. v. Delaney}, the district court rejected a party’s unilateral use of predictive coding because it violated an earlier court-approved agreement and the protocols did not provide the appropriate levels of cooperation and transparency.\textsuperscript{184}

Continuing this discussion (albeit coming out in the opposite direction), in \textit{In re Biomet M2a Magnum Hip Implant Products Liability Litigation}, the district court determined that the non-responsiveness documents from the seed set fell outside of the scope of discovery because, by their defining characteristic, they were not responsive.\textsuperscript{185} Even still, the \textit{Biomet} court urged \textit{Biomet} to rethink its refusal.\textsuperscript{186}

In 2014, in \textit{Dynamo Holdings Ltd. Partnership v. Commissioner}, the tax court approved the petitioner’s request to predictive coding, in part, because they promised to retain e-discovery experts to meet with the respondent’s counsel or his experts.\textsuperscript{187} On the other hand, the \textit{Dynamo} court also articulated a view that judges typically should leave the manner of review to the responding party unless the requesting party was able to show a deficiency.\textsuperscript{188} This implies a limited role for courts to manage discovery for the participation norm.

In early 2015, Magistrate Judge Peck returned with a second major order involving predictive coding.\textsuperscript{189} In \textit{Rio Tinto PLC v. Vale S.A.}, the district court asserted, “[T]he case law has developed to the point that it is now black letter law that where the producing party wants to utilize TAR for document review, courts will permit it.”\textsuperscript{190} But the district court acknowledged that the required level of transparency and cooperation with respect to the training sets re-

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\textsuperscript{181} Gordon, 2013 WL 2250506, passim.
\textsuperscript{182} Id. at *18.
\textsuperscript{183} Bridgestone, 2014 WL 4923014, at *1.
\textsuperscript{184} Delaney, 2014 WL 3563467, at *9, *11.
\textsuperscript{185} In re Biomet M2a Magnum Hip Implant Prods. Liab. Litig., No. 3:12-MD-2391, 2013 WL 6405156, at *2 (N.D. Ind. Aug. 21, 2013); see also Aurora, 2015 WL 10550240, at *2.
\textsuperscript{186} Id. at *18.
\textsuperscript{187} Dynamo, 143 T.C. at 192.
\textsuperscript{188} Id. at 188–89.
\textsuperscript{189} Rio Tinto, 306 F.R.D. at 125.
\textsuperscript{190} Id. at 127.
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mained an open question. And the district court ultimately concluded that other methods—such as statistical estimations—could validate the results and obviate the need for greater process transparency.

2. Lessons Drawn from the Case Law

The seminal case on predictive coding, *Moore*, set out the basic elements of the emerging doctrine. The central inquiry primarily focuses on proportionality. It evaluates the “appropriateness” of predictive coding in an individual case by balancing its accuracy against its costs to determine its value relative to other review methods.

The superintendence of the productions has also come out in the case law. For example, courts also have considered the efficiency of staging predictive coding review and production, trending against setting predetermined raw numerical goals. Additionally, courts have shown concern about accountability regarding the end production, with some courts promoting cooperative transparency and others permitting statistical estimation or other validation methods. Still, courts have shown a fair amount of the deference that is traditionally given to the choices of the producing party.

Courts also have considered how predictive coding fits within the existing evidentiary and professional responsibility obligations. To the former, the application of Federal Rule of Evidence 702 or *Daubert* to the expert testimony that is often necessary to evaluate the proposed protocols has been considered. To the latter, courts are mindful of issues such as the protection of

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191 Id. at 128.
192 Id. at 128–29.
193 Moore, 287 F.R.D. at 191.
195 Compare Moore, 287 F.R.D. at 185, 192 (implementing staging by record custodian, beginning with most relevant sources), with Indep. Living Ctr. of S. Cal. v. City of Los Angeles, No. CV 12-55155-FMO (PJWx) (C.D. Cal. June 26, 2014) (ordering production of the 10,000 most relevant documents found by a predictive coding protocol).
197 See, e.g., Hyles v. New York City, No. 10 Civ. 3119 (AT)(AJP), 2016 WL 4077114, at *1 (S.D.N.Y. Aug. 1, 2016) (denying, in an order by Judge Peck, a request to use predictive coding where one of the litigants objected); Bridgestone, 2014 WL 4923014, at *1 (allowing parties’ request to utilize predictive coding in review of over two million documents); Delaney, 2014 WL 3563467, at *9, *11 (compelling ESI production, but permitting parties’ latitude to determine method of production); EORHB, 2013 WL 1960621, at *1 (allowing parties to forego predictive coding where litigants agreed predictive coding was prohibitively costly); Landow, 2012 WL 1431215 (allowing use of predictive coding at request of the parties).
198 E.g., Moore, 287 F.R.D. at 189.
attorney-work-product and the potential tension between cooperation and zealous advocacy.\footnote{\textsuperscript{199} E.g., Kleen, 2012 WL 4498465, at *1, *19.}

Finally, a trend has been for predictive coding to be used in cases involving relatively sophisticated parties in high-stakes litigation. For example, the plaintiffs in Moore sought damages “in excess of $100 million.”\footnote{\textsuperscript{200} Amended Class Action Complaint at 63, Moore v. Publicis Groupe SA, 287 F.R.D. 182 (S.D.N.Y. Apr. 14, 2011) (No. 1:11-cv-01279-ALC-AJP).} Other major cases also involved class actions or multidistrict litigation.\footnote{\textsuperscript{201} See, e.g., Biomet, 2013 WL 1729682; Kleen, 2012 WL 4498465; Actos, 2012 WL 7861249.}

III. EXAMINING THE TRADE-OFFS

When considering whether to order the use of predictive coding in civil discovery, courts weigh the costs and benefits. In these Mathews-style assessments, courts have focused on pragmatic implementation issues such as the relative efficacy and efficiency of predictive coding processes. But this emerging jurisprudence fails to include the stress that the opacity of predictive coding processes can place on the norm of knowledgeable participation by parties without significant resources.

This Part starts by describing the existing debates about the use of predictive coding in civil discovery that appear in the case law and academic literature. It then surfaces and analyzes the under-examined normative trade-off between accuracy and cost-efficiency on the one hand and participation on the other that is latent in the emerging doctrine.

A. Accuracy and Economic Efficiency Considerations

Most evaluations of predictive coding include some discussion of the baseline practical aspects of discovery in civil litigation.\footnote{\textsuperscript{202} See, e.g., Moore v. Publicis Groupe, 287 F.R.D. 182, 189–90 (S.D.N.Y. 2012); Nasuti, supra note 5, at 241.} In 2013 in Moore v. Publicis Groupe, Magistrate Judge Peck explained, “The goal is for the review method to result in higher recall and higher precision than another review method, at a cost proportionate to the ‘value’ of the case.”\footnote{\textsuperscript{203} Moore, 287 F.R.D. at 190.}

Embedded within Magistrate Judge Peck’s statement are the twin concerns of discovery’s general proportionality inquiry: accuracy and cost-efficiency. These are two of the three principle concepts of procedural justice.\footnote{\textsuperscript{204} See supra notes 45–52 and accompanying text (describing tenets of procedural justice).} Thus, it is necessary but not sufficient that these instrumentalist norms
are present in the jurisprudence, even as courts and scholars still wrestle with their practical components, as described below.

1. Accuracy

Virtually every order on predictive coding discusses its ability to ensure a reasonably complete and accurate production. And, as Magistrate Judge Peck’s statement in the introduction to this subsection illustrates, measures of predictive coding’s efficacy have largely focused on their recall and precision. In this context, “recall” is the percentage of documents that are identified as relevant by a predictive coding search process. “Precision” is the fraction of the recall pool of documents that actually are relevant.

But these measures should not be treated as the ends themselves. Instead, the goal is about ensuring a reasonably complete production. And scores for relevance are not the same as measurements of importance. For example, a unique document might score poorly for potential relevance (because there are no good comparators from the seed set) but be very important because of its particular content.

Even the superior recall and precision of predictive coding is subject to debate. Many scholars and academics take the view that manual review is no longer the “gold standard.” Two studies published in 2010 helped drive this view. These studies showed that predictive coding’s recall and precision

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206 Kantner, 2015 WL 1470334, at *3; Dynamo, 143 T.C. at 192; see also Karl Schieneman & Thomas C. Gricks III, The Implications of Rule 26(g) on the Use of Technology-Assisted Review, 7 FED. CTS. L. REV. 239, 250 (2013).
207 Grossman-Cormack Glossary, supra note 63, at 27.
208 Id. at 25.
211 Yablon & Landsman-Roos, supra note 12, at 669.
213 E.g., Moore, 287 F.R.D. at 190; Grossman & Cormack, supra note 20, at *3.
214 Remus, supra note 10, at 1702–03 (discussing the Grossman & Cormack study, supra note 20, and a study by Herbert Roitblat, infra note 215).
could exceed that of manual review. But even these studies contained caveats. For example, one study warned that the variability of human judgment made it difficult to find a baseline from which to assess the relevance determinations. And others have argued that more research is required. Illuminating the validity of the latter point, a Sedona Conference Working Group in 2016 still cited to studies that are older than five years, which is a fairly significant period of time given the rate of technological change.

Additionally, the recall and precision of any given predictive coding process will hinge on input variations. For example, predictive coding can struggle with certain types of electronic files, such as spreadsheets or graphics. And any mistakes in the initial coding can taint the model training—and, thus, the final results—unless it is caught and corrected.

Another disputed input issue is whether the initial training set is selected through either random or judgmental sampling. With the former, the selection draws randomly form the total population. For the latter, a subject-matter expert selects previously identified documents that are good exemplars of important categories. The downside to random sampling is that it requires a larger sample set or longer time to train the system because the num-

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216 Roitblat, supra note 215, at 76.


221 Yablon & Landsman-Roos, supra note 12, at 642 (describing disagreements in the literature and between leading practitioners).

222 Id.

223 Id. A variation on the judgmental sampling involves the creation of a “perfect” document. Id. at 639.
ber of relevant documents will likely be lower. On the other hand, judgmental sampling can introduce skew based on the subject-matter expert’s selection of the documents.

An additional set of unsettled implementation questions goes to quality control. At the front end, this includes the setting of confidence levels, confidence intervals, and prediction score thresholds. The first two measures go to the likelihood that the sample is representative. The third describes the cutoff score for determining whether material is deemed responsive. During the processes, quality can be verified through sampling. And, post-coding, lawyers might manually review the responsive documents or use statistical validation techniques to confirm the reasonable completeness of the production. Although there has been limited academic or judicial debate about these issues, litigants have contested the appropriate levels for the various measures, the extent to which sampling is necessary, and the need for post-coding validation of the results.

2. Cost Efficiency

In addition to examining whether predictive coding processes are accurate, courts and scholars have looked at its cost efficiency. And scholars have gone further, discussing how efficiency should be normatively defined and to whom its benefits should accrue.

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224 Id. at 643.
225 Id.
226 Losey, supra note 9, at 57; Yablon & Landsman-Roos, supra note 12, at 645.
227 Grossman-Cormack Glossary, supra note 63, at 12.
228 Yablon & Landsman-Roos, supra note 12, at 645.
229 Losey, supra note 9, at 33.
230 Schieneman & Gricks, supra note 206, at 265, 269; Yablon & Landsman-Roos, supra note 12, at 642.
231 Schieneman and Gricks argue that Federal Rule of Civil Procedure 26(g) requires such validation methods, which potentially clashes with Magistrate Judge Peck’s Moore decision, but this has not been explicitly debated. Schieneman & Gricks, supra note 206, at 265, 269. The Rio Tinto decision appears to clear up any lingering tension. See Rio Tinto PLC v. Vale S.A., 306 F.R.D. 125, passim (S.D.N.Y. 2015).
233 See, e.g., Moore, 287 F.R.D. at 189–90. This focus on monetary costs, of course, is part of a more general trend in civil procedure. See Coleman, supra note 23, passim. And the costs are not unrelated to the accuracy. See Bruce H. Kobayashi, Law’s Information Revolution as Procedural Reform: Predictive Search as a Solution to the in Terrorem Effect of Externalized Discovery Costs, 2014 U. ILL. L. REV. 1473, 1502.
Efficiency has primarily been defined by its ability to deliver a higher number of relevant documents at lower monetary cost than other methods.\(^{234}\) Some scholars have questioned whether the potential losses in comprehensiveness are problematic, even while acknowledging the necessity of addressing proportionality concerns.\(^{235}\)

This emphasis on costs can be hard to concretely evaluate because vendors are reluctant to publicly disclose their pricing.\(^{236}\) But there is widespread agreement that even expensive predictive coding processes can reduce discovery costs for cases involving large amounts of text-based electronic documents because of the low incremental costs of applying the process to each additional document.\(^{237}\) This, however, is not undisputed, with some arguing that predictive coding is appropriate in smaller cases and some arguing that it can be fiscally inefficient even in larger cases.\(^{238}\) Also, discovery disputes likely are more expensive when they involve experts.\(^{239}\)

Even assuming that predictive coding provides more accurate and comprehensive results at a lower cost, it is not settled how the gains should be distributed between the parties.\(^{240}\) A court might allocate the benefit to the requesting party, increasing the amount of material that must be produced.\(^{241}\) Alternatively, the court might permit the requesting party to produce only as much it would have under conventional methods and saving further ex-

\(^{234}\) This, of course, is part of a more general trend in civil procedure. See Coleman, supra note 23, \textit{passim}.

\(^{235}\) E.g., Remus, \textit{supra} note 10, at 1718.


\(^{238}\) Auttonberry, \textit{supra} note 73, at 634–35; Waxse & Yoakum-Kriz, \textit{supra} note 13, at 221.

\(^{239}\) Yablom & Landsman-Roos, \textit{supra} note 12, at 664.

\(^{240}\) \textit{Id.}
The ability to scale and stage review has also led to innovative cost-shifting and cost-sharing proposals. The courts’ focus on cost efficiency also comes under fire as a normative matter. Professor Brooke Coleman provides a comprehensive and forceful critique of the narrow way in which efficiency has been defined in civil procedure. Professor Coleman explains how the incomplete understanding of efficiency excludes vitally important, but difficult to measure, non-pecuniary costs such as the filtering of meritorious claims. She also notes that the predominance of cost sensitivity has led towards non-trial adjudications and plaintiff skepticism by the courts. This voice joins the chorus of scholars and legal authorities who also have challenged the sole focus on costs, noting its problematic limits on other important norms. And some of this criticism has noted how proportionality—that is, the primary mechanism of the conventional efficiency norm—can become a deregulatory tool that especially harms plaintiffs with small-value claims. Finally, the empirical basis for the focus on costs also is questionable, undermining its putative basis.

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242 Id.
243 Losey, supra note 9, at 54.
244 Coleman, supra note 23, passim.
245 Id. at 1795–802; see also Érica Gorga & Michael Halberstam, Litigation Discovery and Corporate Governance: The Missing Story About the “Genius of American Corporate Law,” 63 EMORY L.J. 1383, 1494 (2014) (describing undervalued non-financial aspects of discovery in shareholder actions).
247 See, e.g., FED. R. CIV. P. 26(b) advisory committee’s note to 2015 amendment (“It also is important to repeat the caution that the monetary stakes are only one factor, to be balanced against other factors. The 1983 Committee Note recognized ‘the significance of the substantive issues, as measured in philosophic, social, or institutional terms. Thus the rule recognizes that many cases in public policy spheres, such as employment practices, free speech, and other matters, may have importance far beyond the monetary amount involved.’ Many other substantive areas also may involve litigation that seeks relatively small amounts of money, or no money at all, but that seeks to vindicate vitally important personal or public values.”); Stephen B. Burbank, Proportionality and the Social Benefits of Discovery: Out of Sight and Out of Mind?, 34 REV. LITIG. 647, 651–53 (2015); see also Beckerman, supra note 37, at 549; Edward Brunet, The Triumph of Efficiency and Discretion Over Competing Complex Litigation Policies, 10 REV. LITIG. 273, 280 (1991); Gensler & Rosenthal, supra note 35, at 524; Eric K. Yamamoto, Efficiency’s Threat to the Value of Accessible Courts for Minorities, 25 HARV. C.R.-C.L. L. REV. 341, 393 (1990).
249 Moore, supra note 6, at 1113; Arthur Miller, Testimony at Public Hearing on Proposed Amendments to the Federal Rules of Civil Procedure: Transcript of Proceedings, Judicial Conference Advisory Committee on Civil Rules 37 (Jan. 9, 2014) http://www.uscourts.gov/sites/default/files/civil-rules-public-hearing-transcript-phoenix-az.pdf, [https://perma.cc/Q486-B93M] (“I don’t think it befits the American civil justice system to have this preoccupation with cost, abuse, extortion, clichés that have been thrown out by the defense bar that sadly in my judgment have been picked up in judicial opinions without any empiric demonstration whatsoever.”).
B. Expert Reliability and Professional Responsibility Implications

The increased use of predictive coding also has raised new questions about the role of experts and certain professional responsibilities in civil discovery. These concerns seem to arise after the courts and parties have satisfied their concerns, at least to some extent, with the accuracy and cost efficiency of the processes.

1. Expert Evidentiary Issues

In Moore, the plaintiffs argued that the procedural protections of Federal Rule of Evidence 702 and the Daubert framework applied to the expert testimony offered in support of the predictive coding processes. This echoed the concerns raised by the district court in United States v. O’Keefe, which had reasoned that the technical issues implicated by the discovery processes were beyond a layperson’s understanding and, thus, required reassurances as to their reliability. But the Moore district court rejected the plaintiffs’ arguments, interpreting the procedural protections as only applying to evidence offered to a jury.

Although it is unclear whether any courts have or will heed their advice, the majority of commentators express doubt about the Moore decision on the applicability of the expert-reliability protections. Some scholars have challenged the statutory interpretation, noting that Federal Rule of Evidence 702 is silent as to whether it is limited to trial and questioning how much weight

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250 Federal Rule of Evidence 702 permits a witness to present expert opinion testimony if: “(a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue; (b) the testimony is based on sufficient facts or data; (c) the testimony is the product of reliable principles and methods; and (d) the expert has reliably applied the principles and methods to the facts of the case.” FED. R. EVID. 702.

251 In Daubert v. Merrell Dow Pharmaceuticals, Inc., the Supreme Court interpreted Federal Rule of Evidence 702 and concluded that the “trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.” 509 U.S. 579, 589 (1993). The Court then outlined factors that trial judges are to consider in making this assessment. Id. at 593–94.

252 Moore, 287 F.R.D. at 188.

253 United States v. O’Keefe, 537 F. Supp. 2d 14, 24 (D.D.C. 2008) (“Given this complexity, for lawyers and judges to dare opine that a certain search term or terms would be more likely to produce information than the terms that were used is truly to go where angels fear to tread. This topic is clearly beyond the ken of a layman and requires that any such conclusion be based on evidence that, for example, meets the criteria of Rule 702 of the Federal Rules of Evidence.”); see also Victor Stanley, Inc. v. Creative Pipe, Inc., 250 F.R.D. 251, 260 n.10 (D. Md. 2008); Equity Analytics, LLC v. Lundin, 248 F.R.D. 331, 333 (D.D.C. 2008).

254 Moore, 287 F.R.D. at 188–89.

the term “help the trier of fact” can bear. 256 Additionally, the skeptics argue that, with the growth in ESI, the importance of discovery and its management has grown because of the potential case development and cost issues. 257 The protections also help educate the courts and inspire more confidence in their ability to evaluate the reliability of the testimony. 258 These commentators further contend that the costs of the expert-reliability protections would not necessarily be a significant burden because the specter will encourage cooperation, the utilization of the technology will offset some of the dispute costs, and judges can sequence hearings while scaling productions. 259 Finally, these protections might be necessary in that some experts have suggested that some protocols would not survive a Daubert challenge, which speaks to their potential lack of reliability. 260

On the other hand, Professor Dana Remus offered some thoughtful insights in support of forgoing the use of Daubert hearings. 261 She argued that vendors would end up testifying about their own products because of the lack of broader comparative data on the technologies. 262 Professor Remus also raised the concern that applying Daubert would entrench predictive coding in the realm of technology experts, not lawyers. 263

At a normative level, these concerns about the reliability of expert testimony primarily seem to go to the issue of accuracy. But, regardless as to whether Daubert applies, this dialogue in the jurisprudence also, at minimum, gestures towards the importance of explanations.

2. Professional Responsibility Implications

A new technology like predictive coding can introduce wrinkles to virtually all of the myriad discovery practices an attorney might undertake when dealing with ESI. 264 This subsection discusses the four professional responsibility implications that have already come to the fore.

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257 Gelb, supra note 13, at 1296–97.

258 Waxse & Yoakum-Kriz, supra note 13, at 220.

259 Id.; Symposium on the Challenges of Electronic Evidence, supra note 256, at 1239–40.

260 Nelson & Simek, supra note 64, at 24.

261 E.g., Remus, supra note 10, at 1712.

262 Id.

263 Id.

First, the predictive coding doctrine largely privileges cooperation. The potential tension between cooperation and zealous representation was recognized and addressed early in the case law. In 2012, in *Kleen Products LLC v. Packaging Corp. of America*, Magistrate Judge Nolan began by quoting the Sedona Conference Cooperation proclamation:

> Lawyers have twin duties of loyalty: While they are retained to be zealous advocates for their clients, they bear a professional obligation to conduct discovery in a diligent and candid manner. Their combined duty is to strive in the best interests of their clients to achieve the best results at a reasonable cost, with integrity and candor as officers of the court. Cooperation does not conflict with the advancement of their clients’ interests—it enhances it. Only when lawyers confuse advocacy with adversarial conduct are these twin duties in conflict.

Along these same lines, the district court in *Martinelli v. Johnson & Johnson* approved an order in which the parties agreed “that their counsel’s zealous representation of them is not compromised by conducting discovery in a cooperative manner.” And, in its explanation for taking the same position, the Seventh Circuit Committee’s pilot program on electronic discovery explained that a failure to cooperate could lead to increased litigation costs. Once again though, Professor Remus offers a reminder to undertake a critical assessment, noting that the move towards cooperation is happening at the same time the goal of comprehensiveness is losing its primacy, leading to a potential break with the adversary system that is designed to protect clients and lead to just results.

The particular form of cooperation urged by the courts—that is, sharing the seed sets—also has raised concerns about the protection of attorney-issues, including whether Model Rule 3.4(a), which prohibits an attorney from obstructing an opponent’s access to information, could be used to require the use of predictive coding).

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265 See supra note 196 and accompanying text.
270 Remus, supra note 10, at 1717–18.
work-product.\textsuperscript{272} The concerns are that the seed set might divulge the mental impressions of the attorney.\textsuperscript{273} Additionally, some of the non-responsive documents might have information that reveals embarrassing or even incriminating conduct that is unrelated to the instant case.\textsuperscript{274} Some courts and scholars have suggested that such concerns are lessened when the seed set is randomly selected, the coding is not included, or a continuous active process is used.\textsuperscript{275} In its application, although not entirely uniform, courts generally have not found that discovery on technologically complex discovery processes implicates attorney-work-product.\textsuperscript{276}

Second, the rapid technological changes associated with predictive coding also raise the issue of competence. A comment to the American Bar Association Model Rule of Professional Conduct on competence only demands that a lawyer to have an understanding of “the benefits and risks associated with relevant technology.”\textsuperscript{277} Likewise, the model rule on a lawyer’s responsibility regarding non-lawyer assistance creates a low bar, requiring only that the lawyer remain aware of how the non-lawyer services are being performed.\textsuperscript{278} But there is a common understanding that lawyers will have to develop greater technical expertise—from better understanding the technology to enhancing their statistical knowledge—to competently serve their client.\textsuperscript{279} And, in the meantime, there might be an element of caution that has inhibited more rapid adoption of predictive coding.\textsuperscript{280} In partial explanation,

\begin{itemize}
\item \textsuperscript{272} E.g., Facciola & Favro, supra note 14, passim; Remus, supra note 10, at 1716–17.
\item \textsuperscript{273} E.g., Facciola & Favro, supra note 14, passim; Remus, supra note 10, at 1716–17.
\item \textsuperscript{274} E.g., Facciola & Favro, supra note 14, passim; Remus, supra note 10, at 1716–17.
\item \textsuperscript{275} E.g., Facciola & Favro, supra note 14, passim; Remus, supra note 10, at 1716–17.
\item \textsuperscript{276} Rio Tinto, 306 F.R.D. at 128; Yablon & Landsman-Roos, supra note 12, at 644–45.
\item \textsuperscript{278} MODEL RULES OF PROF’L CONDUCT r. 1.1 cmt.8 (AM. BAR ASS’N 2016).
\item \textsuperscript{279} Remus, supra note 10, at 1710 (discussing Model Rule 5.3 and its comments).
\item \textsuperscript{280} Joy Flowers Conti & Richard N. Lettieri, E-Discovery Ethics: Emerging Standards of Technological Competence, FED. LAW., Oct.–Nov. 2015, passim (2015); Randy L. Dryer, Litigation, Technology & Ethics: Teaching Old Dogs New Tricks or Legal Luddites Are No Longer Welcome in Utah, UTAH B.J., May–June 2015, at 12, 16; Darla W. Jackson, Lawyers Can’t Be Luddites Anymore: Do Law Librarians Have a Role in Helping Lawyers Adjust to the New Ethics Rules Involving Technology?, 105 LAW LIBR. J. 395, 398 (2013); Remus, supra note 10, at 1719; Vaccaro, supra note 212, at 319 (“Experts say lawyers must be prepared to use a quantitative approach and should also have an understanding of statistics.”). Various methods for doing so include revamping law school curriculum. See Katz, supra note 68, at 965.
\end{itemize}
Rule 26(g) requires that lawyers certify their results, which implies that the lawyers will develop the appropriate competence before using the new technologies—that is, their use will be knowledgeable.281

In addition to flagging the changing set of competencies, some commentators have asked whether the use of predictive coding might negatively impact traditional areas of attorney competence. For example, one large law firm partner asked, “More often than not, you’re trying to learn your case through the documents, and how will we substitute that function of learning from the documents when you’re using predictive coding?”282 Although predictive coding protocols do not eliminate human reviewers completely (if only for the coding of the training sets), the point remains that the potential efficiency gain might have an unintended downside.

Third, related to the issue of technical competence, some commentators have questioned whether the use of predictive coding might veer towards the unauthorized practice of law.283 Given its technical complexity, predictive coding generally will require the involvement of non-lawyer technicians who might have a primary role in the process.284 But the concerns about unauthorized practice of law might be mitigated because predictive coding primarily operates as a tool of the attorney, not the client.285 And, in this way, the processes might resemble the outsourcing of document review, which is not unauthorized practice of law so long as licensed attorneys oversee it.286 If an attorney lacks the technical expertise to understand the predictive coding processes, however, the attorney will not be able to adequately superintend the review.287 One additional challenge is that courts’ analyses have often employed analogies to human tasks, which does not always appreciate the

283 E.g., Remus, supra note 10, at 1709–11.
284 See John S. Dzienkowski, The Future of Big Law: Alternative Legal Service Providers to Corporate Clients, 82 FORDHAM L. REV. 2995, 3001 (2014) (discussing the expansion of legal services to include a broader array of disciplines, particularly with large corporate clients).
285 E.g., Remus, supra note 10, at 1709–11. Accordingly, there is potential disagreement about the strength of the client-protection interest that animates much of the unauthorized practice of law jurisprudence. Id.; see also Remus & Levy, supra note 14, at 538–42; Deborah L. Rhode & Lucy Buford Ricca, Protecting the Profession or the Public? Rethinking Unauthorized-Practice Enforcement, 82 FORDHAM L. REV. 2587, 2595 (2014).
286 Remus, supra note 10, at 1709.
287 Id.; see also Matt Hassett et al., Managing Outsourcing and E-Discovery, COUNSEL, Feb. 2014, at 15, 17.
unique elements of the technology. The final complication that arises around the potential unauthorized practice of law is when (or whether) even human document review consists of the practice of law.289

One last issue—the inadvertent production of protected material—brings together the concerns about cooperation, protection of attorney-work-product, and competence. Given the volume of ESI, perfect review for material protected under either the attorney-client privilege or attorney-work-product doctrine is unrealistic. Commentators, however, differ as to the likelihoods that courts would find either that the privilege was waived by using an outside vendor or that the attorney failed to take reasonable steps to prevent disclosure by using the technology.290 And while Federal Rule of Evidence 502 was designed to address these concerns and encourage the use of review technology, inadvertent disclosure still means that an opposing party has seen material it should not have.291

While these discussions are important to the development of the doctrine and the regulation of the profession, the larger question—and the focus of this Article—is not about lawyers’ formal compliance with their basic professional responsibility obligations in a new context but, instead, about the consideration of legal norms that should inform how all litigation players—from parties to lawyers to judges—approach how opaque technologies are used in civil discovery. And, so far, the jurisprudence and scholarship has not placed an emphasis on the role that explanations play in serving the participation norm.

C. Under-Examined Normative Trade-Off Between Economic Efficiency and Participation

1. Defects of the Existing Approach

The significant, under-examined aspect of predictive coding in civil discovery is the trade-off between accuracy and cost-efficiency on one hand and the norm of participation on the other, particularly as it would apply to liti-

288 Remus & Levy, supra note 14, at 540–41.
290 Compare Murphy, supra note 217, at 645–46 (discussing the reasonability of computer-based analytic methods), and Remus, supra note 10, at 1722 (suggesting the utility of claw-back agreements in cases involving predictive coding), with Vaccaro, supra note 212, at 322–23 (suggesting courts may not allow claw-back of privileged documents absent a showing of reasonable precautions to prevent disclosure, and recommending the use of a privilege log).
gants without significant financial resources. As described in Part II, these are the primary elements of modern procedural justice.\textsuperscript{292} Courts and scholars have primarily focused only on the accuracy and cost efficiency aspects.\textsuperscript{293} But the larger issue of the jurisprudence’s comportment with procedural justice norms is not as significantly implicated by these two norms because both can be confirmed through statistical validation, obviating the concerns about predictive coding’s intelligibility.\textsuperscript{294} In contrast, the participation norm hinges on explanations, starkly illuminating the intelligibility challenge of predictive coding.\textsuperscript{295}

The participation norm, however, has not been entirely overlooked. For example, Professor Remus questioned how poorer litigants would be able to challenge predictive coding processes and argued that lawyers have an ethical duty to ensure that such parties have access to the technology.\textsuperscript{296} And, at a more general level, some of the push to encourage transparency and cooperation about search protocols can be understood as an attempt to mitigate the potential “black-box” quality of predictive coding for the less sophisticated litigant.\textsuperscript{297} But, other than these gestures to the issue, the trade-off has neither been prioritized nor been explicitly discussed as a normative compromise. Instead, accuracy and cost efficiency have largely been assumed to be the predominant norms at play.\textsuperscript{298}

The normative trade-off warrants more discussion because, although not directly discussed, it is present—if latent—in the burgeoning doctrine.

To be sure, courts frequently “muddle through” new or complicated legal questions.\textsuperscript{299} But a failure to acknowledge underlying \textit{sub silentio} judg-

\begin{itemize}
  \item \textsuperscript{292} See supra note 49 and accompanying text.
  \item \textsuperscript{293} See supra notes 202–249 and accompanying text.
  \item \textsuperscript{294} See supra notes 192, 196 and accompanying text.
  \item \textsuperscript{295} See supra notes 192, 196 and accompanying text.
  \item \textsuperscript{296} See supra note 10, at 1715. Professor Remus’s forthcoming work also briefly identifies that “access to reasons” is a vital component of the legal system and is an area in which new legal technologies might particularly lag. Remus & Levy, supra note 14, at 550–53 (using tax guidance software as an example).
  \item \textsuperscript{297} E.g., Moore, 287 F.R.D. at 192.
  \item \textsuperscript{298} Id. at 190; supra notes 202–249 and accompanying text. Much of this conversation though appears to focus on ensuring good results. See also Craig B. Shaffer, “Defensible” by What Standard?, 13 SEDONA CONF. J. 217, 218–19 (2012); Symposium on the Challenges of Electronic Evidence, supra note 256, at 1236 (“Practice Point Number 7 from the Sedona Search and Information Retrieval[] [states,] ‘Parties should expect that their choice of search methodology will need to be explained, either formally or informally, in subsequent legal contexts, including in depositions, evidentiary proceedings and trials.’”).
\end{itemize}
ments results in future parties (and courts) lacking appropriately clear and coherent guidance.300

The participation norm—and its implication for the judicial management of discovery—is also reflected in the broader case law.301 For example, in a decision that resolved a dispute over a protective order, the United States Court of Appeals for the District of Columbia stated:

This public interest is reinforced by the value we place on the right of every litigant to participate in the process whereby justice is done—to understand and become involved in the proceeding, not to be compelled passively to await its outcome. Regardless of whether these considerations are deemed to be inherent in the principle of due process, they must be accorded considerable weight by a trial judge when considering the propriety of issuing a protective order under Fed. R. Civ. P. 26(c).302

Earlier, this Article rhetorically asked whether a discovery review process provides for intelligible explanations of its choices beyond a showing that the process resulted in a reasonably accurate and complete production.303 This notion is contested—particularly by practitioners—because it raises pragmatic concerns about both the protection of attorney-work-product and costs.304 But recall that courts already are generally permitting discovery on discovery when the requests go to understanding the production processes.305 And, in keeping with this judicial practice, an empirical study has shown that attorneys generally do not favor privileging only speed and expense.306 Moreover, the Supreme Court has acknowledged that there are instances

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300 Fowler, supra note 299, at 155.
302 Doe v. District of Columbia, 697 F.2d 1115, 1119–20 (D.C. Cir. 1983); see also Remus, supra note 10, at 1691.
303 See supra notes 202–249 and accompanying text.
304 See also Solum, supra note 42, at 242. Compare Remus, supra note 10, at 1717 (discussing the tension between production comprehensiveness and nonproduction of irrelevant or privileged documents), with Facciola & Favro, supra note 14, at 32 (suggesting courts are unlikely to accept an argument that seed sets may be withheld as attorney-work-product). Some scholars have pushed this challenge to the general assumptions about discovery even further, arguing that discovery should be understood as having a judicially-recognizable social information-sharing benefit that extends beyond the particular litigants’ instrumentalist ends. See, e.g., Alexandra D. Lahav, The Roles of Litigation in American Democracy, 65 EMORY L.J. 1657, 1689 (2016).
305 See supra note 276 and accompanying text.
when the participation element of the procedural due process requires explanations—implicitly elevating this aspect of the participation norm to a constitutional principle.307

Furthermore, this Article’s ultimate recommendation is not that courts must privilege participation—as it flows from intelligibility—above all else. Rather, the claim is only that courts should acknowledge the new role of opaque algorithms and the stress that might place on the participation norm.308 And a closer look at the norm’s dignity, satisfaction, and legitimacy components illuminates the grounding of this call for intelligibility.309

The dignity aspect of the participation norm “is grounded in the social contract implicit in American constitutional democracy, whereby government agrees to treat its citizens with dignity and respect.”310 In the context of legal process, this means litigants are entitled to processes that enable them to comprehend what is happening and, armed with this understanding, make a case that the decisionmaker treats seriously.311 In other words, the dignity aspect of the participation norm has subcomponents—understanding, voice, and intelligibility—that extend beyond mere accuracy of outcome.312 But how can a less sophisticated litigant be treated with this sort of dignity if the party cannot afford an expert and is facing complex technology whose processes are not tied to the substance of the case? From this flows the premise

307 See, e.g., Wolff v. McDonnell, 418 U.S. 539, 558 (1974) (“The touchstone of due process is protection of the individual against arbitrary action of government . . . .”); Morrissey v. Brewer, 408 U.S. 471, 489 (1972) (listing due process requirements in parole revocation hearings, including the board’s reasons for revoking parole); cf. Harris v. Rivera, 454 U.S. 339, 344 (1981) (“Although there are occasions when an explanation of the reasons for a decision may be required by the demands of due process, such occasions are the exception rather than the rule.”).


309 See Solum, supra note 42, at 260. While I argue that the participation norm is the primary one, intelligibility itself has also been identified as an element of procedural justice. See, e.g., Peter W. Billings, A Comparative Analysis of Administrative and Adjudicative Systems for Determining Asylum Claims, 52 ADMIN. L. REV. 253, 256 (2000).

310 Redish, supra note 21, at 600; see Solum, supra note 42, at 260 (noting that the participation norm “emphasizes dignity and autonomy as a function of the actual participation of litigants in procedures that affect them”).


that a litigant may ask another to explain an opaque technology that is being used within a judicially managed process.\footnote{For the component of the due process norm of participation that is the focus of this Article—that is, intelligibility—one might make a parallel analogy to the right to hear in campaign finance literature. See Burt Neuborne, Ending Lochner Lite, 50 HARV. C.R.-C.L. L. REV. 183, 209 (2015) (explaining how the First Amendment is embedded in state-mandated resolution proceedings); Burt Neuborne, Taking Hearers Seriously, 91 TEX. L. REV. 1425, 1435–36 (2013) (laying out the dignitary and instrumentalist benefits of being able to hear).}

The satisfaction element of the participation norm explains the value of those dignity concerns. A number of studies confirm the relationship between a perception of procedural fairness—with the features described above—and satisfaction with the legal decision.\footnote{See, e.g., William M. O’Barr & John M. Conley, Lay Expectations of the Civil Justice System, 22 L. & SOC’Y REV. 137, 137–38 (1988); Donna Shestowsky, The Psychology of Procedural Preference: How Litigants Evaluate Legal Procedures Ex Ante, 99 IOWA L. REV. 637 passim (2014) (evaluating participant satisfaction with an array of procedural alternatives).} This is so even when the process might be less accurate or more expensive than one that permitted less participation.\footnote{Solum, supra note 42, at 264.} And the sense that justice has been done that follows from the ability to participate is a fundamental aspect of popular government.\footnote{Joint Anti-Fascist Refugee Comm. v. McGrath, 341 U.S. 123, 172 (1951) (Frankfurter, J., concurring) (explaining that legitimate judicial processes “generat[e] the feeling, so important to a popular government, that justice has been done").}

This Article’s claim that litigants have a legitimate interest in intelligible explanations is further buttressed by the increased managerial role of the courts in the discovery process.\footnote{Recall the earlier discussion of how discovery issues played a role in Ashcroft v. Iqbal and Bell Atlantic Corporation v. Twombly. See supra note 59 and accompanying text; see also Ashcroft v. Iqbal, 556 U.S. 662, 685 (2009); Bell Atlantic Corp. v. Twombly, 550 U.S. 544, 558 (2007).} Discovery issues can effectively decide cases.\footnote{See supra notes 55–59 and accompanying text.} Reasoned decision making tied to the substantive legal issues in a case is the essence of procedurally just judicial action.\footnote{See supra notes 42–49 and accompanying text.} This sort of articulation reassures parties that their arguments have been heard and understood.\footnote{Fuller, supra note 319, at 369.} And this serves both the dignity and satisfaction elements, as well as going to a more fundamental conception of political legitimacy that posits a right to meaningfully engage with adjudicative processes that may be binding.\footnote{See supra notes 42–49 and accompanying text.}
Solicitude for the norm of participation matters even more for litigants without financial resources.322 When discovery is stifled, parties might feel disempowered and this feeling of injustice is likely to be enhanced when a plaintiff is facing a defendant who has the more resources such that he or she is able to muster all the necessary facts and arguments without affirmative court interventions.323 This dynamic is aggravated by predictive coding because poorer litigants probably will not understand the technology and will not have the resources to hire experts, leaving them unable to effectively contest the approaches chosen by their richer adversaries.324 In this context, this barrier to equitable, knowledgeable participation is a function of the general opacity of predictive coding processes that results from the technological compromise between interpretability and efficacy.325 But this is not just a natural state that must be accepted; rather, the judiciary has a role to play in managing the impact of the wealth disparities and their ostensibly neutral choices about procedural norms can ultimately determine who benefits.326

On the other hand, the use of predictive coding in civil discovery does not cut in just one direction—even as to the participation norm. Militating for its use, there are several ways in which predictive coding can improve the opportunities for meaningful participation by parties with fewer financial resources. For example, the iterative and content-removed nature of most predictive coding processes removes the asymmetric-information issues that otherwise follow from charging the requesting party to generate key words.327


323 Koppel, supra note 322, at 277. Additionally, while the focus of this Article is the normative trade-off, it has some potentially significant practical implications. For example, one can see how these dynamics mirror those that undergirded Professor Owen Fiss’s argument about how disparities in resources could lead to less just settlements. See Owen M. Fiss, Against Settlement, 93 YALE L.J. 1073, 1076 (1984).

324 Remus, supra note 10, at 1715.

325 Michalski, supra note 306 (manuscript at 35–36); Rich, supra note 2, at 886; Zarsky, supra note 76, at 1520. In the context of credit scoring, one proposal went further, suggesting that “[t]he FTC should be given access to credit-scoring systems and other scoring systems that unfairly harm consumers,” including “not only the datasets mined by scoring systems but also the source code and programmers’ notes describing the variables, correlations, and inferences embedded in the scoring systems’ algorithms.” Citron & Pasquale, supra note 2, at 24–25. And Professor Roth identified a case in which litigants were given access to a breath machine’s source code. Roth, supra note 75, at 1272 (discussing In re Source Code Evidentiary Hearings in Implied Consent Matters, 816 N.W.2d 525, 529 (Minn. 2012)).


327 See Kobayashi, supra note 233, at 1506.
Instead, the requesting party gets the benefit of scalable access to the full universe of documents. And, although the feature weights used by the algorithms are not necessarily causatively related to the underlying legal issue in the litigation, the human judgments applied to the training sets presumably are. Moreover, notwithstanding the procedural legitimacy issues discussed above, as a descriptive matter, it is certainly possible that correlations can provide insights even without being able to engage in the substance. Additionallly, the attenuated mechanical nature potentially reduces the opportunities for intentionally intrusive requests. The dual-edged nature of predictive coding further supports including an assessment of its impact on the norm of participation in the emerging doctrine.

2. Roadblocks to the Normative Inquiry

Although none provide compelling reasons to forgo the normative inquiry, there are several possible explanations for why the judiciary and academy have not yet engaged in deeper examinations of the trade-off. The five main reasons are outlined below.

First, courts frequently have to decide the cases before them without engaging in a more philosophical inquiry about first principles. This is probably especially prevalent in discovery disputes because of the rise in docket-management pressures and the degree to which judicial management of discovery is highly deferential to the trial courts. Accordingly, it is unsurprising that few judges have waxed poetic about the first principle issues raised, perhaps only tangentially or hypothetically, by pre-trial procedural disputes.

Second, many analyses have not fully appreciated that predictive coding is a fundamentally different type of tool than earlier ESI search methods.

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329 See supra note 138 and accompanying text.
332 Compare Alexander Nourse Gross, Note, A Safe Harbor from Spoliation Sanctions: Can an Amended Federal Rule of Civil Procedure 37(e) Protect Producing Parties?, 2015 COLUM. BUS. L. REV. 705, 712 (distinguishing only between paper discovery and general ESI discovery), with supra notes 73–86 and accompanying text (distinguishing paper discovery, predictive coding, and Boolean or keyword searches performed in other forms of ESI discovery).
And this mischaracterization, which ignores predictive coding’s lack of easily intelligible explanations of the causal relationships between the results and the underlying legal substance, naturally leads away from a new examination of the normative trade-off.\footnote{See Redish, supra note 21, at 564; see also Paul Ohm, The Argument Against Technology-Neutral Surveillance Laws, 88 TEX. L. REV. 1685, 1695 (2010) (“While the law should not treat different technologies differently when doing so would reward happenstance and chance, it is also true that some differences deserve to be treated differently.”).}

Third, although challenged by scholars in the context of broader discussions about discovery, economic efficiency (as understood to be a focus on reducing the measurable financial costs of litigation) is the ascendant norm.\footnote{See Coleman, supra note 23, at 1787–93.} And the proportionality requirement embedded in Rule 26 has been understood to require this sort of economic efficiency inquiry.\footnote{See FED. R. CIV. P. 26.} Thus, it is no surprise that courts have looked at the accuracy and cost-efficiency of predictive coding.

Fourth, there might be a Maslow-like hierarchy of needs specific to jurisprudence in which legal analyses move from the most pragmatic concerns to the more abstract.\footnote{See Matthew J.B. Lawrence, Procedural Triage, 84 FORDHAM L. REV. 79, 83 (2015) (applying a similar notion of triage—that is, a strategic allocation of resources to the most pressing problems—to procedural issues); Stephen B. Young, The Moral Basis of American Law: An Hypothesis, 82 U. DET. MERCY L. REV. 649, 655, 681 (2005) (describing a “value-hierarchy pyramid for civil procedure” that goes from a fact, case-based level to overarching norms).} In the context of predictive coding in civil discovery, the first analyses focused on whether the processes worked at their most basic level, asking whether the results were better than alternative methods at getting the right material in a cost-efficient manner.\footnote{See supra notes 202–249 and accompanying text.} Next, courts and scholars thought about the second-order implications of how the processes fit more or less easily within the existing case law.\footnote{See supra notes 250–291 and accompanying text.} And, as this Article begins to do, the third step is examining how the processes either serve or challenge the underlying first principle norms—other than accuracy and cost-efficiency—that animate the jurisprudence as a whole.

Fifth, technology can have a glamour of objectivity and prestige.\footnote{See FRANK PASQUALE, THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION 195 (2015).} One might see the technological element itself acting as a substitute for more substantive legal explanations because it carries with it a different, but still weighty, imprimatur of authority.\footnote{See Citron, supra note 2, at 1271–72.}
3. Need to Futureproof

Although predictive coding in civil discovery is not typically used in cases involving a poorer party with a small-value claim, now is the time for incorporating participation-norm concerns into the emerging doctrine. The growth of ESI and the focus on proportionality make it likely that predictive coding will spread to new contexts involving parties with fewer financial resources.\(^{341}\) And the participation-norms matter even more for such parties, implicating equality issues in addition to the procedural justice elements described above.\(^{342}\) Taken together, this raises important questions about a failure to futureproof the jurisprudence and the risks of calcification.

Futureproofing refers to the practice of developing law to remain relevant despite extrinsic changes over time.\(^{343}\) With technology that changes faster than lawmakers or courts can respond, futureproofing is necessary to avoid obsolescence.\(^{344}\) And the benefits of such a stable doctrine are the enhancement of uniformity and certainty.\(^{345}\)

While stability within the common-law system has its upsides, there also are risks of calcification, which are particularly salient when the formative period is not reflective of the forthcoming context. Legal practices, which might not be theoretically justifiable on their merits, can harden into a long-standing doctrine with unintended effects.\(^{346}\) And these unintended effects can disadvantage vulnerable parties who were never affirmatively considered. For example, the proportionality issue primarily operates in high-value cases but it has, without much in the way of explicit deliberation or justification, migrated to lower-stakes cases.\(^{347}\) And, as discussed above, predictive coding exacerbates the ways in which privileging proportionality can negatively impact the participation norm.\(^{348}\)

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341 See supra notes 292–370.
342 See supra note 324 and accompanying text; see also Lahav, supra note 304, at 1682.
345 See Ohm, *supra* note 333, at 1713. One example where a concern about futureproofing has already played out was in expert handwriting analyses after *Daubert*, where a judge wrestled with the then-reliability of the expert processes. See D. Michael Risinger, *Appendix: Cases Involving the Reliability of Handwriting Identification Expertise Since the Decision in Daubert*, 43 TULSA L. REV. 477, 526–27 (2007).
348 See supra notes 303–325 and accompanying text.
The doctrinal upshot is that courts should futureproof the emerging doctrine of predictive coding in civil discovery by including an explicit and fact-informed weighing of the participation norm. As with most discovery issues, a case-by-case *Mathews* assessment will best enhance the efficient and just workings of litigation. But such a balancing test must both include *all* of the important normative considerations *and* account for the practical application modifications that might be necessary to account for differently situated litigants.

4. Potential Non-Doctrinal Ways to Ameliorate Predictive Coding’s Impact on the Participation Norm

The doctrinal fix suggested above, however, is not the only possible method for dealing with how predictive coding’s opacity might negatively impact the norm of participation for litigants without significant financial resources. There are other available tactics and some of the contextual aspects might change too.

It is possible that some of the pressures leading to the increased use of predictive coding might lessen. While the growth of ESI is unlikely to slow, the Federal Rules of Civil Procedure could be amended to better reflect the normative trade-off, putting a renewed focus on the participation norm. Although the 2015 amendments went in the other direction, other regulatory proposals show an increased interest in ensuring that legal structures protect people who lack significant financial resources.

Additionally, just as predictive coding has been suggested as a technological fix for the problem of the deluge of ESI, more advanced predictive coding technologies might solve the intelligibility problem. Some vendors have already started touting the ability of their software to explain the under-

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350 *Id.* at 1815; *see also* Moore, *supra* note 6, at 1112–14.
351 For example, in May 2016 the Consumer Finance Protection Bureau proposed a prohibition on mandatory arbitration agreements. See 12 C.F.R. pt 1040 (repealed Nov. 1, 2017).
352 A general optimism about the ability of technological advances to solve problems created by earlier technological advances abounds amongst many civil procedure experts. See, e.g., Peck, *supra* note 4, at 3; *Summary of Testimony & Comments*, Advisory Committee on Civil Rules 35 (2013) (statement of Arthur Miller), [http://www.uscourts.gov/sites/default/files/fr_import/CV2014-04.pdf](https://perma.cc/XV4F-MZ3D) (“The problems of e-discovery are likely to resolve themselves as information retrieval science and technology prove to reduce costs, accelerate the process, and enhance the accuracy of retrieval through a combination of statistics, linguistics, and computer science.”) And, in other contexts, sophisticated software increasingly is able to show its work. See Kevin D. Ashley, *Teaching Law and Digital Age Legal Practice with an AI and Law Seminar*, 88 CHI.-KENT L. REV. 783, 792–95 (2013).
lying rationales. And lawyers and courts can use their powers over legal processes—that is, their ability to hire vendors and approve processes, respectively—to further accelerate these developments.

Another solution would be to address how the cost of experts impedes poorer parties from being able to successfully navigate the civil litigation process. For example, courts may appoint experts and shift the costs of experts to the losing parties. Legislative fixes could expand the universe of cases in which fee-shifting for the cost of experts is permitted. Another long-term strategy might be to develop a constitutional right to court-appointed expert assistance under the due process clause. This could take the form of a court-appointed special master. Some professional organizations encourage their members to volunteer services to people in need—although it can be difficult for indigent parties to connect with these sorts of pro bono offerings. To the extent access to experts hinges on funding, lawyers can advance these expenses, and the growth of litigation funding might also portend decreased barriers. Simpler, more elegant solutions geared specifically towards predictive coding access might be for the bar to develop an open-source predictive coding tool, contract for group licenses, or implement a

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354 Remus, supra note 10, at 1723.

355 The right to technological expert assistance is significantly more developed in the criminal context. See, e.g., Theodore J. Greeley, The Plight of Indigent Defendants in a Computer-Based Age: Maintaining the Adversarial System by Granting Indigent Defendants Access to Computer Experts, 16 VA. J.L. & TECH. 400, 403 (2011). On the civil side, this is potentially complicated by the longstanding presumption that each party bears its own discovery costs. See Zubulake v. UBS Warburg LLC, 217 F.R.D. 309, 317 (S.D.N.Y. 2003) (citing Oppenheimer Fund, Inc. v. Sanders, 437 U.S. 340 (1978)). But the illegitimacy of economic costs burdening access to justice has been well established. See Michelman, supra note 42, passim.


358 Medine, supra note 19, at 348–49. But see Kemp v. Dretke, 86 F. App’x 680, 682 (5th Cir. 2004) (rejecting ineffective assistance of counsel claim based on inability to procure mental health expert).


360 Wiseman, supra note 19, at 528.

compulsory licensing scheme.\textsuperscript{362} Although increased access does not necessarily go directly to intelligibility, it would give litigants without significant financial resources first-hand exposure to the technology.

Lawyers’ gamesmanship was identified as another driver of the rise of predictive coding.\textsuperscript{363} Accordingly, changes in professional responsibility norms or rules might reduce the impact of predictive coding on the participation norm. For example, lawyers might cooperate further to reduce discovery disputes. They also could be more transparent about their predictive coding processes, using economic pressure to make their vendors explain some of the mechanisms beyond just the classification decisions in the seed set. This, however, is not meant to suggest that mechanical transparency is equivalent to causative legal explanations. But mechanical transparency as to the algorithms would, at least, be a start.

Even more likely, shifts in technological competence might make generalist lawyers better able to navigate the intricacies of predictive coding. Currently, professional responsibility rules set a very low bar for lawyers’ technological competence.\textsuperscript{364} But this is changing. For example, Magistrate Judge James Francis has said:

E-Discovery is pervasive. It’s like understanding civil procedure. You’re not going to be a civil litigator without understanding the rules of civil procedure. Similarly, you’re no longer going to be able to conduct litigation of any complexity without understanding E-Discovery.\textsuperscript{365}

Some legal practitioners have even argued that the use of predictive coding will itself become an ethical obligation.\textsuperscript{366} And developing competence will be easier if the protocols become more standardized, resolving the implementation controversies described above in Part III(C).\textsuperscript{367}

\textsuperscript{362}Remus, \textit{supra} note 10, at 1722.

\textsuperscript{363}See \textit{supra} notes 292–370.

\textsuperscript{364}Remus, \textit{supra} note 10, at 1710.


\textsuperscript{366}Jackson, \textit{supra} note 279, at 395; Barkett, \textit{supra} note 264 (manuscript at 32).

\textsuperscript{367}Remus, \textit{supra} note 10, at 1722.
Less likely, but no less importantly, litigation actors—be they parties, attorneys, or judges—might more fully integrate an ethical obligation that goes beyond the mere tactical adherence to the rules. Instead, they might better incorporate their responsibility to the underlying norms of procedural justice into their practices. Recognition of the shared responsibility for ensuring truly just processes can only serve to enhance the legitimacy of the legal system and, ultimately, the welfare of society. And one aspect of this ethical obligation is ensuring that every aspect of the litigation process is intelligibly tied to the underlying legal substance.

**CONCLUSION**

Legal doctrines must serve first-principles norms. And, in discovery, the norm of participation is a fundamental principle, ultimately contributing to the legitimacy of judicial processes. In civil discovery, this norm is negatively impacted by predictive coding’s opacity, particularly as projected for litigants without the financial resources necessary to hire technological experts. But the trade-off between the norms of accuracy and cost-efficiency on one hand and participation on the other has not been sufficiently interrogated in either the prior academic or judicial evaluations. Now that predictive coding has passed the initial factual and second-order legal thresholds, this higher-level normative discussion should begin. Contributing to this need for examination of the normative trade-off, the continuing growth of ESI and the downward pressure of the proportionality amendment to Federal Rule of Civil Procedure 26(b) mean that predictive coding likely will spread to more cases. And there is a risk that the current doctrine will ossify, leaving out the concerns of the litigants who both lack significant financial resources and are not generally participating in the contemporary cases through which the jurisprudence is developing. Given these factors, courts should include the potential stress on

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368 DAVID LUBAN, LAWYERS AND JUSTICE: AN ETHICAL STUDY 11, 32, 169 (1988) (obliging lawyers to act with a heightened level of respect for their fellow citizens and suggesting lawyers should be morally active and wrestle with the principles undergirding democracy); Yuzhe Zhao, Rules, Morality, and Legal Ethics: Searching for the Underlying Principle of Lawyer Regulation, 25 GEO. J. LEGAL ETHICS 857, 860–61 (2012).


the participation norm in their case-by-case Mathews analyses when managing discovery disputes involving predictive coding to better futureproof the emerging doctrine.

Predictive coding in civil discovery is not the only area in which rapid technological advances—most saliently, the increased prevalence of big data and artificial intelligence—raise concerns about the ability of legal doctrines to adapt. And, although predictive coding presents issues specific to itself, the general lesson remains the same: procedurally just doctrines must account for technological changes and balance their benefits against the risk that their lay impenetrability might diminish the meaningful participation of less sophisticated litigants in legal processes.