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Technology, Commerce, Development, Identity

Andrea M. Matwyshyn*

Traditional paradigms of technology regulation ask how technology-mediated space¹ is different from non-technology mediated space. Regulation rarely focuses on how technology makes a user develop differently than she/he otherwise would and what those differences might mean for regulatory approaches. Yet, this is perhaps the most important inquiry regulators should undertake as they grapple with crafting law that guides future generations of technology developers and users.

Human development²-centered legislative analyses of new technologies may be rare because a flawed assumption is widely held in the law regarding the nature of human development. Human development has traditionally been conceptualized as a linear proposition—a steady upward trajectory with expected outcomes based on age. We use bright line age restrictions in many contexts, for example, presuming adults are more developed than children.³

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1. When I speak of technology-mediated space, I mean the totality of all human exchanges that rely on technology to facilitate them in material part. For example, all exchanges through the Internet are “technology mediated”, as are automated teller withdrawals, airport check-in procedures, and credit card transactions in real space.

2. See, e.g., Biology Online, available at http://www.biology-online.org/dictionary/Human_development (last visited Apr. 11, 2007) (human development is “continuous sequential changes which occur in the physiological and psychological functions during the individuals [sic] life”).

3. For example, only people aged eighteen or over are typically allowed
The premise for this approach is founded in the traditional developmental psychology theory of Jean Piaget and his progeny. However, more recent theories of developmental psychology point out the flaws in reliance on linear paradigms. The major shortcoming of the linear approach is its failure to acknowledge the role that the environment and cultural tools, such as technology, play in development. Variations in developmental context result in fundamentally different developmental outcomes. This variation presents a critical question for the future of technology regulation. By changing the technology tools of an environment, users' development is fundamentally altered, and regulation focused on a particular technology tool becomes obsolete. These dynamics are better to vote in political elections in the United States.


5. See, e.g., LEV VYGOTSKY, THOUGHT AND LANGUAGE (1962).

6. The term "cultural tool" is loosely defined as a tool which permits an individual to accomplish more than she/he otherwise could and arose out of the work of developmental psychologist Lev Vygotsky. For a discussion of cultural tools, see James V. Wertsch & Peeter Tulviste, L. S. Vygotsky and Contemporary Developmental Psychology, in AN INTRODUCTION TO VYGOTSKY SECOND EDITION 59, 67 (Harry Daniels ed. 2d ed., 2005)

7. For example, a teenager with a laptop and an email account living in Minneapolis can befriend a person living in Ghana and learn information about life in Ghana otherwise unavailable to this teen. The cumulative learning arising out of these technology facilitated experiences alter the developmental process of this Minneapolis teenager.

8. For example, the Controlling the Assault of Nonsolicited Pornography and Marketing Act (CAN-SPAM Act) fell prey to this flawed assumption.
addressed by nonlinear developmental psychology than by traditional linear paradigms.

This article introduces nonlinear developmental paradigms of contextualist and ecological developmental psychology theory to the debate over technology regulation. It argues that technology regulation presents a strong example of the dangers and inefficiencies of blindly adopting an approach to regulating human conduct based solely on linear developmental assumptions. This article specifically explores the legal implications of technology-mediated human development using the technology policy arena of corporate child data security contracting regulation.

Section I introduces the major debates in current legal literature regarding technology regulation and describes the role of linear developmental assumptions in certain existing regulatory paradigms. Section II presents an introduction to nonlinear developmental psychology theory, contrasts it to linear theory, and describes the pivotal role that technology tools play in developmental outcomes. Section III uses the example of the Children’s Online Privacy Protection Act (COPPA) and the corporate child data protection contracting obligations thereunder to illustrate the practical shortcomings of always presuming developmental linearity in regulatory paradigms. Section IV argues that technology regulation should first and foremost be understood as the regulation of human development; it usually requires a nonlinear developmental paradigm as its starting point. Only regulation which adopts a focus on user behaviors in social context can succeed; regulation focusing on technology creation, on the...
other hand, will not. Our regulatory paradigms must be sensitive to these emergent\textsuperscript{10} human development dynamics.

I. TRADITIONAL REGULATION PARADIGMS FOR TECHNOLOGY-MEDIATED COMMERCE: IS TECHNOLOGY SPECIAL?

Society has undergone an economic and cultural shift driven by technology.\textsuperscript{11} Both industry pundits\textsuperscript{12} and the U.S Department of Commerce assert that the “new economy” is not a myth and that a fundamental, information technology-driven change has occurred.\textsuperscript{13} In a 2002 report, the Department of Commerce\textsuperscript{14} indicated that despite the recession within the

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\textsuperscript{10} Emergence is order that arises from the interactions of individual actors within a complex system, demonstrating a global pattern that could not have been forecast simply from understanding the behavior of one particular actor. See STEVEN JOHNSON, EMERGENCE: THE CONNECTED LIVES OF ANTS, BRAINS, CITIES AND SOFTWARE 18 (Scribner 2001).


\textsuperscript{13} See Price & McKittrick, supra note 11, at 5 (“The central feature of the [technology-driven] ‘new economy’ has been a higher growth rate of productivity, which in turn has brought faster gains in our standards of living.”).

industry, information technology producers still contributed disproportionately to the United States’ economic growth and continued to grow at double digit rates.\textsuperscript{15} Most people consider familiarity with computers an essential element of the ability to achieve future economic success.\textsuperscript{16} This section briefly reviews the historical legal debate surrounding three key sets of technology policy issues from the last ten years. In each set of issues, judges and regulators have been asking themselves whether technology regulation is “special.” In other words, judges have been forced to confront the question of whether current regulatory paradigms can expand to successfully address technological innovation. This question remains unresolved for each set of issues, questioning the success of current regulatory paradigms. A new set of regulatory paradigms may be needed, one that is able to evolve alongside and simultaneously with the technology interactions it governs.

A. DO TECHNOLOGY TRANSACTIONS REQUIRE SPECIAL RULES?

Perhaps the earliest case law and legal theory discussions of appropriate paradigms for technology regulation occurred in the context of technology contracting.\textsuperscript{17} Technology, both as

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Studies indicate, however, that increasing numbers of workers are not able to acquire access to the technological resources needed to ensure productivity in a progressively digitized world economy. See Luc Soete, \textit{ICT's and Employment: The Problem of Job Quality}, 140 Intl. Labour Rev. 143, 156 (2001). The impact of information and communications technologies on jobs is not yet known and no outcome is inevitable. See id. at 160. Technology-driven changes in organizational structures, employment relations, worker autonomy, and work organization will not automatically result in higher job quality. See id. at 154-57. In 2000, 800,000 technology jobs were estimated to have gone unfilled because of a dearth of qualified workers. Microsoft Corp., Valuing Diversity, http://www.microsoft.com/issues/essays/2000/11-15diversity.mspx (Published Nov. 15, 2000). This resulted in an estimated opportunity cost of $4 billion per year. Id. Although numbers from 2000 may reflect inflated employment resulting from the technology “bubble,” the “[g]rowth in demand for high quality digital products and electronically delivered services is expected to fuel the demand for skilled IT workers in the future.” Cooke, \textit{supra}, at 59.

\textsuperscript{15} Id.


\textsuperscript{17} See, e.g., Step-Saver Data Sys. v. Wyse Tech., 939 F.2d 91 (3d Cir. 1991) (deciding the issue of what constituted the agreed use of the technology).
the subject matter of agreements\textsuperscript{18} as well as the technological means of contract formation,\textsuperscript{19} presented challenges to traditional contracting paradigms.\textsuperscript{20} Similarly, technology exacerbated preexisting doctrinal tensions in contract law with regard to, for example, the tension between the efficiency of form contracting and the desire for personalized assent in contracts.\textsuperscript{21}

As the subject matter of transactions, new technology raised questions regarding whether separate default rules under the Uniform Commercial Code (UCC) should be required for software transactions.\textsuperscript{22} Proponents of revisions to the UCC argue that software presents a different context from a standard goods transaction and calls for new rules.\textsuperscript{23} Those opposed argued that previous rules could grow to encompass changes in types of goods and that attempting to craft technology-specific rules would result in a limited approach that would be outgrown.\textsuperscript{24} Ultimately, the UCC Article 2

\begin{itemize}
  \item[18.] I am referring to debates over agreements such as software and digital content licensing agreements, software and website development agreements, and online services agreements such as hosting agreements. For a discussion of issues in software licenses, see, e.g., Robert Gomulkiewicz, \textit{Getting Serious About User-Friendly Mass Marketing Licensing for Software}, 12 GEO. MASON L. REV. 687 (2004).
  \item[19.] I am referring to debates over enforceability of, for example, clickwrapped agreements versus brownewrapped agreements such as terms of use. For a discussion of terms of use, see, e.g., Mark Lemley, \textit{Terms of Use}, 91 MINN. L. REV. 459 (2006).
  \item[20.] Specht v. Netscape, 150 F. Supp. 2d 585, 587 (S.D.N.Y. 2001), aff’d, 306 F.3d 17 (2d Cir. 2002) (“Assent may be registered by a signature, a handshake, or a click of a computer mouse transmitted across the invisible ether of the Internet.”); ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1451-53 (7th Cir. 1996) (in which the use of software was at issue). For a discussion and analysis of the above and other cases dealing with contracts and software use, see Ryan J. Casamiquela, \textit{Contractual Assent and Enforceability in Cyberspace}, 17 BERKELEY TECH. L.J. 475 (2002).
  \item[21.] See, e.g., ProCD, Inc., 86 F.3d at 1451-53 (pointing out the regularity of purchasing software before agreeing to the terms of use and discussing when a contract is formed).
  \item[22.] See, e.g., Warren E. Agin & Scott N. Kumis, \textit{A Framework for Understanding Electronic Information Transactions}, 15 ALB. L.J. SCI. & TECH. 277, 298 (2005). Today the digital contracting landscape has been further complicated by the software industry’s shift from an off-the-shelf software model to a services-focused model which includes both code and support. \textit{Id.} at 299.
  \item[24.] Peter A. Alces, \textit{W(h)ither Warranty: The B(l)oom of Products Liability}
revision was considered impractical by many and it did not gain widespread acceptance. Whether there should be default rules in technology transactions remains unresolved, particularly with regard to default contracting rules for using, sharing and creating open source code.

In the context of legislating rules for technology mediated contract formation, federal and state digital signature legislation was considered impractical by many and it did not gain widespread acceptance. Whether there should be default rules in technology transactions remains unresolved, particularly with regard to default contracting rules for using, sharing and creating open source code.


legislation established parity for real space and virtual space technology mediated signatures. This legislative statement came relatively early in the mainstreaming and commercialization of the Internet, arriving before users and businesses understood how to fully leverage it. Although financial services companies, particularly brokerage houses, were early adopters of digital signatures, many other companies were sometimes slow to incorporate digital contracting into their procedures. Consequently, digital


signature legislation’s full potential perhaps remains unrealized.

Corollary questions also pertain to the logistics of online payment mechanisms in digitally executed contracts. Regulators have not adopted a clear position regarding whether Internet mediated payment methods require the extension of real space default rules for financial transactions and consumer protections. For example, the FDIC stated in an advisory letter that it does not consider PayPal to be a bank. However, various state regulators have begun to question whether PayPal is operating an unauthorized money transmitting service, or illegal banking service.30 Scholars are at odds on this point as well, debating whether consumer protection necessitates extending the penumbra of real space banking law to cyberspace.31

Finally, tensions persist in the age-old form contracting debates over efficiency through adhesion contracts versus fairness through customization and negotiability.32 The technology context is beginning to disrupt the existing imperfect peace. In particular, end user license agreements (which authorize conduct many technologists consider unethical)33 now challenge legal lines. For example, digital rights management software which comes bundled with other products engages in conduct that would constitute computer intrusion were it not for consent granted during installation through ostensible acceptance of a form contract.34 The clash of traditional intellectual property law paradigms with technology contracts presents unresolved questions about whether technology is special, as demonstrated in the dramatic differences in contracting norms between open source and proprietary software licenses.35

32. For a discussion of the tradeoffs between standardization and customization, see, for example, Margaret Jane Radin, Online Standardization and the Integration of Text and Machine, 70 FORDHAM L. REV. 1125 (2002).
33. For a discussion of overreaching in digital rights management software and license agreements, see Andrea M. Matwyshyn, Technoconsen(t)sus, __WASH.UL.REV.__ ( 2007)
34. Id.
35. For examples of open source license agreements see, e.g., Nelson, Open Source, Open Source Licenses, http://www.opensource.org/licenses (submitted Sept. 2006). For a discussion of Internet contracting, see, for
B. ARE TECHNOLOGY HARMS NOVEL AND DO THEY NEED SPECIAL REDRESS?

Court and scholars have also struggled with the question of whether technology mediated harms are qualitatively and quantitatively different from real-space harms. In other words, the question was whether these harms warranted special redress, and, if yes, how should any such damages be calculated. Specifically, harms relating to speech, dignitary harms, child protection, and intangible property damage vexed judges and scholars.

Because of the novelty and increased anonymity of the Internet, free speech became emboldened in virtual space. Predictably, claims arose out of this emboldened speech. Corporate claims arose relating to alleged harms from various forms of Internet speech—postings or emails of disgruntled or overzealous corporate insiders or outside pump-and-dump fraudsters posting information to financial bulletin boards or other Internet forums. For consumers, Internet communications raised questions of dignitary harms, unwanted access to personal property, such as intrusion into their hard drives, and unwanted use of personally identifiable information. Internet defamation claims arose. Spam began as merely annoying speech usurping resources but now may be imposing financial harms onto

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recipients in new ways. Similarly, forms of spyware, may currently involve conduct closer to computer intrusion than digital speech. Finally, new types of dignitary harms may arise from digital divides in our society. Courts generally


have not provided recourse for unequal access, though the Americans with Disabilities Act may be expanded in the near future to require website accessibility for the disabled. Thus, no consensus exists as to whether harms resulting from technology are unique and warrant different regulatory paradigms.

Technology easily and obviously also exacerbated real space harms in the area of child protection. Several statutory attempts to protect children from online predators, unsuitable content and data mining have been made. However, the approaches have not alleviated the problems faced in this area, and courts have not always been willing to enforce the statutes. Filters and other proactive technological means, rather, are commonly advocated as being more effective than reactive legal measures. Legal scholars diverge as to whether technology focused statutes are the optimal means for minimizing and redressing these harms.


50. For a discussion of technology and child protection, see, for example, William D. Araiza, Captive Audiences, Children and the Internet, 41 BRANDEIS L.J. 397 (2003); Jared Chrislip, Filtering the Internet Like a Smokestack: How the Children's Internet Protection Act Suggests a New Internet Regulation Analogy, 5 J. HIGH TECH. L. 261 (2005); Dannielle Cisneros, “Virtual Child” Pornography on the Internet: A "Virtual" Victim?, 2002 DUKE L. & TECH. REV. 19; Cathleen A. Cleaver, Cyberchaos vs. Ordered Liberty: Protecting Children from Pornography on the Internet, 1 TEX. REV. L. & POL. 61 (1997); Mehagen
Scholars and judges have considered redress for technology harms through speech restrictions, intellectual property statutes, computer intrusion statutes and the trespass to chattels\textsuperscript{51} doctrine. Yet, the unwillingness of courts to robustly calculate damages in cases of digital harm\textsuperscript{52} and the


\textsuperscript{51} For a discussion of Internet trespass, see Michael R. Siebecker, \textit{Cookies and the Common Law: Are Internet Advertisers Trespassing on our Computers?,} 76 S. CAL. L. REV. 893 (2003).

\textsuperscript{52} For a discussion of calculating damages in technology intrusion contexts, see George Roach & William J. Michiels, \textit{Damages Is the Gatekeeper Issue for Federal Computer Fraud,} 8 TUL. J. TECH. & INTELL. PROF. 61 (2006). For example, in the context of intentional violations where an individual exceeds authorized access to a computer or network, no statutory damages are available under the Computer Fraud and Abuse Act (CFAA). 18 U.S.C. § 1030 (2000). In addition, the approach used to assess damages varies from court to court. Under section 1030(g) of the CFAA, a private right of action is available for any victim who suffers “damage or loss” due to a violation of the CFAA. Damage, as defined under § 1030(e)(8) of the statute, requires either (A) losses aggregating $5,000 during any 1-year period to one or more individuals; (B) impairment to medical diagnosis or treatment; (C) physical injury to any person; or (D) a threat to public health or safety. Many plaintiffs have encountered problems meeting the $5,000 threshold for damages. Two schools of thought exist regarding the proper interpretation of the CFAA damage
hesitation to expand civil doctrines such as trespass to chattels into technology contexts calls into question the judiciary’s commitment to providing legal redress for harms from digital speech. This judicial reluctance may have in part catalyzed the dramatic increases in intangible property harms such as identity theft and trade secret theft of the last ten years.

C. IS THE INTERNET A SEPARATE LEGAL SPACE NEEDING SPECIAL LEGAL RULES?

The final great theoretical debate in technology legal theory revolves around equivalency of virtual and physical geography—should the Internet be legally characterized as a separate space or merely as an extension of physical space for

requirements in § 1030(g) for “damage or loss.” While “damage” is defined and requires a plaintiff to meet a threshold of $5,000, the term “loss” is not adequately defined in a fashion that allows courts to meaningfully and consistently interpret the statute. Courts have also differed as to whether damages to multiple plaintiffs in a class action lawsuit can be aggregated in order to meet the $5,000 threshold and the extent to which loss of goodwill can be included in calculations. But under the Electronic Communications Privacy Act, minimum statutory damages are indicated on the basis of an escalating series of violations; minimum damages start at $50, and quickly rise to $10,000. 18 U.S.C. § 2520 (2000). However, a debate exists in the courts whether courts have the discretion not to award any damages in some cases. See, e.g., Culbertson v. Culbertson, 143 F.3d 825, 827 (4th Cir. 1998) (holding that courts have discretion); Reynolds v. Spears, 93 F.3d 428, 434 (8th Cir. 1996) (same); Nalley v. Nalley, 53 F.3d 649, 652 (4th Cir. 1995) (same). But see Desilets v. Wal-Mart Stores, Inc., 171 F.3d 711, 714-16 (1st Cir. 1999) (suggesting in dicta that courts must award damages); Rogers v. Wood, 910 F.2d 444, 448 (7th Cir. 1990) (holding that courts must award a minimum of $10,000 in statutory damages per violation), reh’g denied, 914 F.2d 260 (1990); Menda Biton v. Menda, 812 F. Supp. 283, 285 (D. Puerto Rico 1993) (holding that courts must award damages).


regulatory purposes? In other words, is technology best characterized as a limitation on or an extension of social control, sovereignty, and autonomy legal frameworks that exist in real space. This debate over this legal characterization of virtual space began at the time the first browsers came into existence. A clear divergence of opinion existed in the scholarly community over both the legitimacy of the Internet as a separate space and the legitimacy of Internet regulation as a separate field of legal study.

This theoretical debate has its practical incarnation in the case law of Internet jurisdiction and enforcement of judgments. The lines of geographic sovereignty became ambiguous as far away courts sometimes granted litigants general or personal jurisdiction over residents of other states based on Internet contacts. Internationally, foreign courts and regulatory


56. Mosaic was developed in 1993 by two University of Illinois graduate students, Marc Andersen and Eric Bina. JOHN CASSIDY, DOT CON 51 (2002). Immediately following the launch of Mosaic, use of the World Wide Web increased. See id.


58. General jurisdiction refers to the situation where a court asserts jurisdiction over a defendant whose continuous activities in the forum are unrelated to the cause of action sued upon but the defendant’s contacts are sufficiently substantial and of such a nature as to make the state’s assertion of jurisdiction reasonable. See, e.g., Patrick J. Borchers, The Problem with General Jurisdiction, 2001 U. CHI. LEGAL F. 119, 137-39 (2001) (arguing that the concept of general jurisdiction is fatally flawed, particularly in the context of the Internet, but should not be abandoned).

bodies adjudicate matters with foreign defendants engaging in technology-mediated international conduct. Foreign defendants refuse to appear or to assert lack of jurisdiction even in the face of default judgments, exposing the limits of international judgment reciprocity.

Similarly, technology complicated tax nexus determinations; questions of tax nexus required determining whether the Internet was a separate transactional space or whether territorial tax paradigms applied. In particular, practical difficulties arose in determining whether adequate contacts existed for purposes of nexus between certain Internet goods and services and a certain jurisdiction. For example, one vexing tax question pertains to whether and where software, especially downloaded software, should be taxed. Should it be taxed at the point of residence on a server or at the place of ultimate download by a user? Similarly, taxation of web-based software services present unresolved legal questions that turn on where in physical space the Internet services are “performed”.

D. LACK OF RESOLUTION IN LEGAL PARADIGMS MAY LEAD TO BREAKDOWNS OF USER TRUST

To date, none of these sets of legal questions have been conclusively resolved by either courts or legislatures. Technology businesses and users continue to exist in a state of regulatory uncertainty. As a result, one of the most serious threats to the future of technology-mediated commerce is a breakdown of user trust in technology.

60. See, e.g., Joris Evers, Spam fighter hit with $11.7 million judgment, CNET NEWS.COM, Sept. 14, 2006, http://news.com.com/Spam+fighter+hit+with+11.7+million+judgment/2100-7350_3-6116009.html (noting that defendant UK-based Spamhaus “didn’t mount a defense in the case; the ruling was a default judgment in absence of counterarguments”).


62. For a discussion of trust and the Internet, see Tamar Frankel,
Trust arises through predictability and certainty in transactions and recourse. However, as demonstrated by the preceding discussion, courts, legislators, and scholars have not reached consensus on any of the three major sets of technology regulation questions debated in the last decade. This lack of consensus suggests that it is necessary to re-examine the underlying regulatory assumptions regarding humans’ relationship with technology. Perhaps the regulatory focus should move away from regulating the technology itself and move toward regulating the ways humans interact with technology tools. A focus on proactively guiding human development of users rather than a focus on reactively restricting particular technologies may hold more promise. Legislative approaches are usually compartmentalized around either restricting a particular technology or resolving a particular legal issue. Rarely is a technology user’s perception or development presented as a focus of the overall regulatory picture.

Technology regulation frequently presumes that users are a one-dimensional, linear, and stagnant piece of the regulatory picture. This assumption is based in early developmental psychology theory. However, this approach is not informed by later bodies of human development theory which view humans and their development as inherently dynamic and multidimensional.

This flawed assumption about the linear nature of human development may be part of the reason for the inability to craft successful regulatory and judicial approaches to technology-mediated exchanges. Legislators and judges should seek to create a new regulatory picture that supports the dynamic levels of complexity that users experience in technology mediated exchange. The new regulatory focus becomes users’ development.


63. Id.

64. Complexity here refers to complexity theory, the idea that systems exist where a large number of similar but independent actors who persistently move, respond, and evolve in relation to each other in an increasingly sophisticated manner. For a discussion of complexity theory, see, for example, David G. Post & David R. Johnson, “Chaos Prevailing on Every Continent”: Toward a New Theory of Decentralized Decision-making in Complex Systems, 73 CHI.-KENT L. REV. 1055 (1998). See also, e.g., Erica Beecher-Monas & Edgar Garcia-Rill, Danger at the Edge of Chaos: Predicting Violent Behavior in a Post-Daubert World, 24 CARDOZO L. REV. 1845 (2003); Susan W. Brenner, Toward a Criminal Law for Cyberspace: Distributed Security, 10 B.U. J. SCI. & TECH. L. 1 (2004); Jim Chen, Webs of Life: Biodiversity Conservation as a
this set of emergent interactions and may prove instructive for beginning to craft new dynamic regulatory paradigms.

II. NONLINEAR DEVELOPMENTAL PSYCHOLOGY, TECHNOLOGY, AND CONSTRUCTING COMMERCIAL IDENTITY

Human development theory or developmental psychology theory can be divided into linear and nonlinear developmental theory. Linear developmental theory presumes that all humans develop in a similar fashion, demonstrating an upward developmental trajectory that is tied to chronological age. Nonlinear developmental theory adopts the opposite approach. It asserts that chronological age cannot necessarily be tied to assumptions about development because development is an inherently social process that occurs in a particular real-world context. Consequently, a linear approach to technology regulation presumes a homogeneity in the consumer population regarding individuals' sophistication and comfort level with technology based on their chronological age. Chronologically older individuals should demonstrate more proficiency than those of chronologically younger age. A nonlinear approach would not make these assumptions. Linear developmental psychology is reflected in the work of theorist Jean Piaget, while nonlinear developmental psychology theory is perhaps best reflected in the work of Lev Vygotsky. Urie
Bronfenbrenner,\textsuperscript{70} Albert Bandura,\textsuperscript{71} and Erik Erikson.\textsuperscript{72}

\textbf{A. LINEAR DEVELOPMENTAL THEORY}

Linear developmental psychology theory, as demonstrated by the work of Jean Piaget, creates an age-contingent, lock-step trajectory for human development.\textsuperscript{73} Piaget divided development into four periods with distinct stages therein, and named these periods of development the sensorimotor period, the preoperational period, the concrete operational period, and the formal operational period.\textsuperscript{74} The sensorimotor stage lasts from birth to age two and is characterized by a child moving from simple reflexes to organized behaviors that are oriented toward interacting with the external world through goal oriented exploration behaviors and object permanence\textsuperscript{75} skills.\textsuperscript{76} The preoperational period, which spans age two until age seven, follows, and during this period one develops semiotic function—the ability to use symbols.\textsuperscript{77} Differentiation of other people from the self is incomplete, however, even though one is
able to interpret the world in terms of the self in a loosely logical manner. The concrete period comes next, and lasts between ages seven and eleven. The concrete period is marked by the ability to perform logical mental operations, which are internalized and can be reversed. Finally, the formal operational period from age eleven to age fifteen is a time characterized by abstract thinking where mental operations are not necessarily tied to concrete objects. At this point in a linear developmental paradigm adulthood arrives and development stops. Therefore, adulthood signals the highest level of development in a linear paradigm, when full development is “achieved.”

B. NONLINEAR DEVELOPMENTAL AND IDENTITY THEORY

Other developmental theorists have developed nonlinear approaches that hold important contrary insights to the views of Piaget and other linear developmental theorists. Unlike the lockstep approach of linear theorists, nonlinear theorists take a dynamic approach. An individual interacts with and within a particular social context to generate development in an emergent manner.

Lev Vygotsky, the founder of contextualist developmental theory and a contemporary of Piaget, introduced the importance of analyzing development in a cultural context. The smallest unit of analysis for Vygotsky is the child in a particular social context, an inherently variable construction across environments and individuals. Learning and

78. Id. at 53-54.
79. See id. at 56.
80. See id. at 56-59.
81. See id. at 60-62.
82. Piaget’s model of cognitive development ends with the acquisition of formal operational intelligence during teen years. For a discussion of various linear developmental paradigms see, e.g., ADULT DEVELOPMENT: VOLUME I: COMPARISONS AND APPLICATIONS OF DEVELOPMENTAL MODELS (Michael L. Commons et. al, eds., 1987).
83. See PIAGET, REFLECTING ABSTRACTION, supra note 3; see generally MILLER, supra note 65.
84. The works of Lev Vygotsky, Urie Bronfenbrenner, Albert Bandura and Erik Erikson provide important insights into the way development and identity are inherently dialectical and interactionist joint constructions.
85. See LEV VYGOTSKY, THOUGHT AND LANGUAGE (Alex Kozulin, ed. & trans., 1986).
development occurs on the person-society border through an individual interacting inside the “zone of proximal development”. The zone of proximal development refers to the gap between the actual developmental level of the child at the time and the higher level of the child’s potential development with help from adults or more advanced peers. Help in development comes not only from humans in the environment but also from self-help using cultural tools such as computers. For Vygotsky, humans master themselves from the outside through psychological and technical tools, which allow individuals to achieve more in their specific context. These tools, however, also vary depending on culture and social contexts. In other words, the focus of assessment using a Vygotskian developmental paradigm is less on the static notion of who the child currently is and, rather, more on the dynamic question of who the child can become, depending on context and tools.

An elaboration on the evolving, nonlinear nature of social contexts that shape development can be found in the work of Urie Bronfenbrenner. Bronfenbrenner presents an ecological model that illustrates the importance of reviewing multiple levels of social context. Specifically, he identifies four levels of analysis: (1) macrosystem; (2) mesosystem; (3) exosystem; and (4) microsystem. Analysis at the macrosystem level requires examination of culture as a whole, along with belief

87. Id.
88. Id.
89. Id.
90. Id.
91. Id.
92. See, e.g., URIE BRONFENBRENNER, THE ECOLOGY OF HUMAN DEVELOPMENT: EXPERIMENTS BY NATURE AND DESIGN (1979) [hereinafter BRONFENBRENNER, ECOLOGY]; URIE BRONFENBRENNER, INFLUENCES ON HUMAN DEVELOPMENT (1975); URIE BRONFENBRENNER, INFLUENCING HUMAN DEVELOPMENT (1973); URIE BRONFENBRENNER, ON MAKING HUMAN BEINGS HUMAN (1981); URIE BRONFENBRENNER, TWO WORLDS OF CHILDHOOD (1973); URIE BRONFENBRENNER, TWO WORLDS OF CHILDHOOD - US AND USSR (1975); R. MYERS & URIE BRONFENBRENNER, THE TWELVE WHO SURVIVE: STRENGTHENING PROGRAMMES OF EARLY CHILDHOOD DEVELOPMENT IN THE THIRD WORLD (1992).
93. An ecological model is a model which conceptualizes a dynamic set of interactions in a living system. For a discussion of ecological models, see, e.g., James Moore, Predators and Prey: A New Ecology of Competition, HARV. BUS. REV., May/June 1999, at 75.
94. See BRONFENBRENNER, ECOLOGY, supra note 92.
95. See id. at 7-8.
systems and ideologies underlying cultural rules and norms. In other words, the analysis focuses on the mechanisms of social governance and the worldview prevalent in civil society. Analysis at the mesosystem level focuses attention on interpersonal dynamics and the dynamics between the individual and secondary settings, such as the workplace. Analysis at the exosystem level contemplates the interactions outside of the primary sphere of analysis but which, nevertheless, affect or are affected by what happens in the primary setting. At the microsystem level, analysis is primarily focused on individuals and their psychological development in a particular context. The individual interacts within and across all four levels and consequently develops because of these interactions.

Albert Bandura’s Social Learning Theory presents a consonant analysis. The theory views the interaction between individuals and environments as a three way exchange in which the person, an entity with unique characteristics, performs a behavior in an environment which responds back to the person and the behavior in a process of reciprocal determinism; it is an idiosyncratic interaction. According to Bandura, models can serve to instruct, motivate, disinhibit, inhibit, socially facilitate, and arouse emotion in a process of vicarious reinforcement. Essentially, development is a process of quantitative change, during which learning episodes gradually accumulate over time. Although Social Learning Theory does not directly address historical or cultural context, it reflects the tradition of Vygotsky and the contextualist

96. See id. at 258.
97. Id. at 209.
98. Id. at 237.
99. Id. at 56.
101. BANDURA, SOCIAL LEARNING THEORY, supra note 100, at 40-50.
102. See id. at 117–19.
103. Id.
approach. It recognizes the dialectical process of development where individuals work within and are shaped by an environment; a triadic reciprocal determinism occurs among behavior, cognitive factors and the environment.\textsuperscript{104} Also, as in the theory of Vygotsky, there is no endpoint to development, and universal behaviors are rare.\textsuperscript{105} Thus, children are developmentally malleable but only within constraints of biology and environment.

Finally, Erikson frames development through identification of eight stages/dichotomies of human development and identity formation: (1) basic trust versus mistrust; (2) autonomy versus shame; (3) initiative versus guilt; (4) industry versus inferiority; (5) identity versus role confusion; (6) intimacy versus isolation; (7) generativity versus stagnation; and (8) ego integrity versus despair.\textsuperscript{106} Erikson's first three stages represent early stages when the individual is not yet capable of interacting with (borrowing a Vygotskian phrase) “cultural tools” such as the Internet.\textsuperscript{107} The eighth stage is similarly a stage in which the individual is primarily conquering internal dynamics, and, therefore, interaction with culture, its tools, and other individuals is not the primary focus of the stage.\textsuperscript{108} Conversely, in the intermediate stages, the individual is learning from and making a place in society.\textsuperscript{109} The child becomes a different person in each stage with different cognitive capacities and progressively achieves a greater ability to interact with a wider range of people.\textsuperscript{110} For Erikson, the ego can only remain strong through interactions with cultural institutions that enable the development of the child's capacities and potential.\textsuperscript{111} As in all nonlinear theory, Erikson's stages are not bound to chronological age.

These four schools of nonlinear developmental theory offer useful analytical lenses for (re)theorizing and assessing technology regulation.

\textsuperscript{104} See id. at 194–96.
\textsuperscript{105} Because self-beliefs play a key role in development, trajectories are inherently varies. For a discussion of the role of and variations of self-beliefs in development see, e.g., ALBERT BANDURA, SELF-EFFICACY: TOWARD A UNIFYING THEORY OF BEHAVIORAL CHANGE (1977).
\textsuperscript{106} See ERICK ERIKSON, CHILDHOOD AND SOCIETY 247-74 (1950).
\textsuperscript{107} See generally id. at 247-58.
\textsuperscript{108} See id. at 268.
\textsuperscript{109} See ERICK ERIKSON, CHILDHOOD AND SOCIETY 247-74 (1950).
\textsuperscript{110} See id. at 258–59.
\textsuperscript{111} See generally id. at 190–204.
C. LESSONS FROM NONLINEAR DEVELOPMENTAL THEORY FOR TECHNOLOGY COMMERCE

Nonlinear developmental theory offers five concrete lessons for crafting successful technology regulation. First, nonlinear developmental theory instructs us that human development and learning is always situated; the zone of proximal development varies across individuals. Second, development is an emergent phenomenon. Third, learning and development do not always cleanly map on to chronological age. Fourth, regulating the way that humans interact with technology means contemplating multiple layers of context that cooperate or conflict to generate development. Finally, technology is merely a tool that assists humans in achieving more than they otherwise could; the regulatory and developmental focus should always remain human-centric.

Nonlinear developmental theory reminds us of the importance of regulatory context or the situated learning of the individuals whose conduct the law tries to govern. Development is not something that happens to humans in a preordained manner; rather development is an interactive process that occurs on the person/society border. Therefore, the society a person experiences pushes the course of his or her development and vice versa. Learning and development of both children and adults occurs at different paces across different individuals, contingent in each case upon social context in the Vygotskian “zone of proximal development”. Therefore, the variations within the context of development must be considered when crafting regulatory paradigms. The same biological individual in two different social contexts will arrive at two different developmental outcomes. A successful regulatory paradigm will consider both.

Similarly, humans exist in a particular emergent social context. The social context—including the technology itself—changes in frequently unpredictable ways. Thus, regulating in

112. Emergence, generally, is order that arises from the interactions of individual actors within a complex system, demonstrating a global pattern that could not have been forecast simply from understanding the behavior of one particular actor. See STEVEN JOHNSON, EMERGENCE: THE CONNECTED LIVES OF ANTS, BRAINS, CITIES AND SOFTWARE (2001).

113. See supra notes 100-102.

a manner predicated on static assumptions about people and technology results in law destined for quick obsolescence. Both human behavior and technology will evolve in response to law. Law must be capable of evolving as well.

Nonlinear developmental theory reveals that effects on individuals’ development and behavior are emergent across multiple layers of context. As Bronfenbrenner’s ecological model asserts, a human is inherently embedded in multiple systemic layers that influence developmental outcomes and behaviors. It is through the convergence of these multiple layers of influences that development and corresponding behaviors arise. Thus, a law pushing on development in the macrosystemic layer will influence an individual, but three additional layers of influence coexist in the space. Multiple developmental layers must coincide in pushing in the direction sought by the regulation. The influence of the exosystem of social norms, the mesosystem of peer groups and the economic exchange, and the microsystem of the individual’s current state of development all come into play. Viewing the lessons of the model in the context of crafting effective regulation, without considering the impact of regulation on each of these interrelated layers, regulation can frequently be circumvented or ignored, or it may impact behavior in unanticipated and undesirable ways.

Development does not always map onto chronological age. An adult user whose only interactions with a software application occur once a week for an hour in a library on a shared machine experiences technology development and learning differently than does the ten year old child with a

116. Bronfenbrenner’s ecological model is represented as a series of concentric circles—or, as Bronfenbrenner characterized it, “like a set of Russian dolls”—with the microsystem level in the innermost circle and macrosystem in the outermost circle. See BRONFENBRENNER, ECOLOGY, supra note 92, at 3.

117. For example, the CAN-SPAM Act, a macrosystem rule which aimed to regulate communication on the mesosystem level, lacked adequate macrosystem and mesosystem enforcement mechanisms. No private right of action was created by the law and agencies empowered to enforce it suffer from limited resources. Spammers have recognized this lack of enforcement and adapted to a behavior of either defiance of the law or feigned compliance. This feigned compliance consists of spammers including an opt-out footer at the bottom of emails that is not honored. Instead it is used as a method of verifying that a user checks the email account. For a discussion of spammer noncompliance with CAN SPAM see, e.g., Matwyshyn n.9 supra. See also, e.g., BRIAN S. MCWILLIAMS, SPAM KINGS (2004).
laptop in her bedroom. Technology can both equalize abilities and exacerbate differences. The adult with illegible handwriting is as easily understandable in email as the adult with clear penmanship. But, comfort with technology frequently maps onto number of hours spent interacting with computers—something driven by access to computing resources, which is a function of financial resources.\textsuperscript{118}

New technologies should be analyzed merely as tools in a Vygotskian sense. They enable a user to accomplish more than the user ordinarily could without the tool. As such, the conduct that arises from this assisted action is not new; it is merely amplified conduct. As with any amplification, the waves of the conduct reach further and more potently than if the conduct had not been amplified. This broader reach necessitates a different legislative approach. Regulating technology creation is not the answer; regulating humans, their conduct, and use of that technology is a more promising approach.

Finally, the broader identity development goals of the individual provide context for the conduct of the individual. At various stages of life, developmental progress intersects with identity goals, creating another lens guiding individual behavior and developmental outcomes. Because these identity goals are inherently social in nature, two layers of context push on the individual. First, the context shaping development through interactions, and, second, the context in which the individual attempts to work toward identity goals.\textsuperscript{119} For example, when resolving the Eriksonian conflict of generativity\textsuperscript{120} versus stagnation, an individual may seek to generate something greater than herself by turning to technology tools such as the Internet that have previously influenced her development. Technology regulation is not (and should not be) about regulating the creation of the technology

\textsuperscript{118} Several studies have demonstrated a correlation between time spent using computers and positive attitudes toward technology. See, e.g., Traci L. Anderson, Relationships Among Internet Attitudes, Internet Use, Romantic Beliefs, and Perceptions of Online Romantic Relationships, 8 CYBERPSYCHOL. & BEHAV. 521 (2005). Lacking access to technology, therefore, by itself creates disadvantage.

\textsuperscript{119} See supra notes 117-18.

\textsuperscript{120} Generativity is the concern over accomplishing a lasting impact on society through socially valuable work that guides the next generation of humanity. For a discussion of generativity see, e.g., Dan P. McAdams, R.I. Logan, What is generativity?, in THE GENERATIVE SOCIETY 15-31 (E. de St. Aubin et. al., eds. 2004).
itself. Rather, technology regulation should consider humans’ use of tools.

These humans, perhaps unlike the technology itself, can demonstrate extreme levels of variation; however, they provide a more efficacious, though more complicated, point for regulation. Because different environments generate different developmental and learning experiences, humans’ experience with technology varies. For some humans, technology-mediated contexts immediately cause consternation or resignation in ways that wholly real space contexts do not. For other humans, however, no palpable difference exists between technology-mediated and real space interactions. For still a third group of people, real space contexts are more likely to cause discomfort than virtual ones. Technology is merely a tool, and, like every tool, some people are better at wielding it than others. This multimodal distribution of technology comfort and proficiency does not map chronological age, nor is it absent among the regulators and judges crafting our technology regulation paradigms.

Placing these five lessons in regulatory context, COPPA demonstrates how ignoring these five lessons of contextualist developmental theory can result in regulatory suboptimality.

III. CASE STUDY: CHILDREN’S DATA SECURITY
CONTRACTING AND THE CHILDREN’S ONLINE PRIVACY PROTECTION ACT

The case study of COPPA, intended to safeguard information about children that websites collect for commercial leveraging, demonstrates the shortcomings of a legislative approach driven by linear assumptions about development.

A. LEGAL HISTORY OF COPPA

The technology tool of the Internet has caused society to reconceptualize the value of user data and, consequently, the role that privacy and personal information control play within our society.\(^{121}\) Widespread Internet access has caused consumers to start to reevaluate the importance of control over their personal information and their children’s information.\(^{122}\) Meanwhile, corporate entities have begun to place a premium

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121. See, e.g., ROBERT O’HARROW, NO PLACE TO HIDE (2005).
on consumer information, particularly in corporate acquisitions.\textsuperscript{123} As the technology boom hit in the late 1990’s and the European Union worked on adopting the EU Data Directive\textsuperscript{124} in member states, Congress chose to address data protection in a segmented fashion, starting with Internet child data protection and COPPA.\textsuperscript{125}

COPPA became effective in April 2000.\textsuperscript{126} COPPA requires that websites targeting children under the age of thirteen provide notice of privacy practices and obtain verifiable parental consent prior to collecting data from the child.\textsuperscript{127} The statute also empowers the Federal Trade Commission (FTC) to promulgate additional regulations to require the operator of a website subject to COPPA to establish and maintain reasonable procedures “to protect the confidentiality, security, and integrity of personal information collected from children.”\textsuperscript{128} Additionally, commentary to the promulgated regulations states the appropriate security measures for protecting children’s data include, without limitation or proscription, “using secure web servers and firewalls; deleting personal information once it is no longer being used; limiting employee

\begin{itemize}
\item \textsuperscript{123} For a discussion of the transformation of user data into a marketable commodity, see Jessica Litman, \textit{Information Privacy/Information Property}, 52 \textit{Stan. L. Rev.} 1283 (2000).
\item \textsuperscript{124} Council Directive 95/46/EC, On the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data, 1995 O.J. (L 281) 31 (E.C.).
\end{itemize}
access to data and providing those employees with data-handling training; and carefully screening the third parties to whom such information is disclosed.”

COPPA leaves much discretion in data security to the individual website operator and creates no external reporting mechanism to monitor internal security improvements of website operators subject to COPPA.

Specifically, COPPA stipulates that prior to collection of data from a child under thirteen, a website “operator” must obtain “verifiable parental consent.” The preferred medium for this verifiable parental consent is receipt of a fax from the parent. An email exception was originally crafted as an interim measure to be phased out over time. This email exception evolved into a “sliding scale approach” which is still applied by the FTC in COPPA inquiries. Depending on the character of the data collection and the intended use, the FTC’s analysis varies. For example, the need to obtain verifiable parental consent does not pertain equally to all child data gathering; the situation where a website collects data for a one-

129. Children’s Online Privacy Protection Rule, 64 Fed. Reg. 59,888, 59,906 (Nov. 3 1999). Sadly, this articulation of the technology specifications is suboptimal. For example, the implementing regulations instruct companies to use “secure servers”, but servers cannot be inherently “secure” or “vulnerable.” Securing a server is a process that is ongoing. Perhaps a better phraseology would be to have required companies to take all steps identified by a leading security research firm as the fundamental exercise of care in attempting to secure a server on an ongoing basis.

130. Id. However, encryption was deemed to be potentially cost prohibitive and left to the discretion of entities, as was the suggested use of contractual provisions requiring minimum standards of data care from third parties granted access to the collected children’s data.


132. Verifiable parental consent was ideally constructed as a process involving e.g. faxing parental signatures to each website permitted to collect a child’s data. See 15 U.S.C. §§ 6501-06 (1998); see also Children’s Online Privacy Protection Rule, 16 C.F.R. § 312.5 (2005). This process allows for easy circumvention as no independent means of authenticating the parental signature would exist.

133. Because of the cumbersome nature of the faxing, email verification of parental consent was subsequently permitted. See 15 U.S.C. §§ 6501-6506 (1998); see also Children’s Online Privacy Protection Rule, 16 C.F.R. § 312.5 (2005). Though this exception was originally intended to be phased out, it has persisted. Email verification is susceptible to even easier child circumvention than fax verification.

time use and does not permanently connect the child with the information does not necessitate the same degree of consent verifiability. Additionally, a safe-harbor program exists where third party certificate authorities can attest compliance of websites with COPPA. The FTC is empowered to institute regulatory prosecutions against entities violating COPPA. These prosecutions result in fines and consent decrees. Amounts of fines have varied, with the most recent levied at $1,000,000 against Xanga.com, a social networking website. Prior prosecutions have been few in number, and previous fines have not exceeded $500,000.

135. See 15 U.S.C. §6501-6506 (1998); Children’s Online Privacy Protection Rule, 16 C.F.R. § 312 (2007). In particular, one of the COPPA exceptions provides for one time collection, provided the information is subsequently destroyed. See 15 U.S.C. §§ 6501-06; see also Children’s Online Privacy Protection Rule, 16 CFR § 312. In practice, companies frequently learned how to live within the exceptions to the extent possible to avoid compliance.


137. See United States v. Xanga.com, Inc., No. 06-CIV-682(SHS) (S.D.N.Y. Sept. 7, 2006), available at http://www.ftc.gov/os/caselist/0623073/xangaconsentdecree.pdf. On September 7, 2006, the FTC and Xanga.com settled the regulatory action. Xanga.com acknowledged that it failed to notify parents and obtain consent before collecting, using, and disclosing the information of users it knew to be under thirteen. Despite the user agreement’s statement that children under thirteen could not join, children could register using a birth date showing they were younger than thirteen. After Xanga.com allegedly knew of their age-specific registration, the company failed to put in place measures to prevent collection of their personal information. Xanga.com also failed to notify the children’s parents of the company’s information practices or provide parents with access to and control over the information collected on their children. Id.

During the first six years of its effectiveness, COPPA has received mixed reviews at best. The deterrent effect of prosecutions appears to have been limited. A large number of websites which are governed by COPPA are simply noncompliant and are willingly to risk prosecution rather than investing effort in an attempt to comply with COPPA. As demonstrated by several studies, compliance is generally under 60%, and even websites that attempt compliance are frequently easily circumvented in their age verification process.

Businesses have complained that the cost of COPPA compliance associated with monitoring usage, drafting privacy policies, and obtaining proof of parental consent runs as much as $200,000 per year by some estimates. In some cases, companies have deemed the costs of compliance prohibitive and simply ceased operations. For example, some websites removed highly interactive elements from their sites shortly after COPPA’s passage, alleging that compliance costs rendered certain lines of business unsustainable.

COPPA protects the data of children who wish to have their data protected. For children who simply wish content access, in many instances immediate workarounds are readily available. Often the child merely needs to log in again and

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139. See, e.g., Joseph Turow, The Annenberg Pub. Policy Ctr. of the Univ. of Pa., Privacy Policies on Children’s Websites: Do They Play by the Rules? (2001), http://www.asc.upenn.edu/usr/jturow/PrivacyReport.pdf. Two studies of COPPA compliance by the University of Pennsylvania’s Annenburg Public Policy Center and by the Center for Media Education reported that although most of the sites they reviewed had privacy policies and limit the information collected from children, these privacy statements did not include required disclosures and used language that was difficult to understand. Id.


142. Charny, supra note 141; Wolinsky, supra note 141.

143. Id.

144. See, e.g., Net Family News, supra note 140.
provide a false birth date to gain access to the material to which they were denied access.\footnote{Id.}

As such, the business-focused crafting of the statute ignored the practical realities of child-technology and child-parent interactions. COPPA adopted a clearly linear, static view in addressing children’s activities online. Its shortcomings result in part from this paradigm.

B. COPPA IS NOT GROUNDED IN A NONLINEAR DEVELOPMENTAL THEORY

As discussed previously, developmental psychology has moved toward studying individuals in a social context instead of focusing on decontextualized traits. Fundamentally, individuals eventually internalize the intellectual life of the people around them, and humans create themselves and their cognitive development through activity. Looking to our culture’s “tools”, primarily the Internet, which bridge the physical and social world for the child, learning is always situated and the zone of proximal development varies across individuals. COPPA’s framework presents a static framework that does not take into account these nonlinear insights.

First, COPPA presumes that parents are more developmentally advanced than their children regarding technology. COPPA is predicated on the idea that an adult parent’s proficiency with technology surpasses that of her child, an assumption research demonstrates is unsustainable.\footnote{See, e.g., Stefanie Olsen, Parents shaky about kids’ safety online, CNET NEWS.COM, Aug. 10, 2006, available at http://news.com.com/Parents+shaky+about+kids+safety+online/2009-1025_3-6104028.html} Technology learning and development do not always cleanly map on to chronological age. Parents frequently feel their ability to monitor their children’s activities online is limited.\footnote{Id.}

Second, the age of capacity to consent to data gathering stipulated in COPPA, age thirteen, appears to have been selected arbitrarily. During early adolescence, large divergences in development are visible, perhaps even more so than in later life. Even assuming a linear paradigm, since the issue at hand relates to data security contracting, a logical age of consent might mirror contractual capacity generally. Assuming the linear paradigm of contract law, the usual age of
contractual capacity is eighteen.

Third, COPPA takes into account only one computing context, the home, and presumes a parent is available during the child’s Internet time. However, children frequently access the Internet and give away information about themselves using computers at school, at friends’ houses, in the home when parents are not present, and in the library. Therefore, a regulatory paradigm presuming parental presence does not reflect the reality of children’s situated learning in multiple contexts.

Fourth, both technology use and development are emergent phenomena. COPPA did not take into account the norms of corporate conduct that would arise to circumvent its restrictions. Because COPPA grants no private rights of action to parents, enforcement of COPPA is the sole province of the FTC, which is an understaffed and overburdened agency. As demonstrated by widespread noncompliance, companies frequently run a risk-benefit calculus regarding the likelihood of prosecution and decide to risk regulatory action rather than invest in compliance structure.

Finally, COPPA presents a technology-focused regulatory design; the focus is on each website that chooses to collect children’s data. As technology evolves, a website-centric approach is destined for obsolescence. A more promising regulatory design would be constructed in a human-centric manner focusing on the child and the child’s information. Such an approach would not only demonstrate greater versatility and regulatory longevity, but systemic efficiencies would result over the current system. In lieu of each website needing to institute a separate age verification process for each child, and each parent approving each website, a child-focused approach could be constructed in such a manner to allow for a single parental approval and a single website registration. In this way, economies of scale could be created through a child data protection structure focused on the child rather than on the website operator. Such an approach would also acknowledge that parents may be less knowledgeable and need more protection than their children, sub-optimally suited for a role of gatekeeper.
IV. THE FUTURE OF TECHNOLOGY COMMERCE REGULATION: NONLINEAR DEVELOPMENTAL PARADIGMS AND THE EMERGENCE OF THE ECONOMIC CYBORG

As the example of the COPPA illustrates, lessons of nonlinear developmental psychology offer promising insights for crafting future generations of technology regulation. The evolutionary nature of nonlinear developmental paradigms allow for the flexibility to regulate both an evolving technology context and an emergent developmental context for consumers. As consumers become more technology proficient, their use of technology tools will change. Consequently, their development and identity formation will follow a different path from prior generations of consumers.

Turning to Erikson’s insights regarding identity development, the dualities of industry versus inferiority, identity versus role confusion, intimacy versus isolation, and generativity versus stagnation will be resolved in new ways by future generations. Successful regulation will be sensitive to these human dynamics. The ability of individuals to work effectively, find a place in society, connect with others and create things outside themselves all play out through use of technology tools. The future holds a world where progressively more individuals’ work will involve technology creation and use. In our post-information revolution economy, consumer transactional behaviors are moving into technology-mediated space. Growing numbers of people in the United States have Internet access, and online spending is increasing by approximately 25% annually. Consumer economic identity is increasingly characterized by a hybrid real space-virtual space set of economic and social behaviors; consumer spending through e-commerce is growing. Meanwhile, digital entrepreneurship and content creation is on the rise. Growing numbers of individuals are participating in technology-

mediated content creation.\textsuperscript{151} A successful technology regulatory regime will be sensitive to all of these emergent dynamics. It will assist users in leveraging technology tools toward guiding their own development and viewing themselves as commercial cyborgs—technologically-empowered consumers and citizens. This developmental evolution is critical to building commercial trust in the future information technology-mediated economy.