

## Great Refusal or Long March: How to Think About the Internet

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I've just published a new book entitled *(Re)Inventing the Internet* with chapters by my former students and collaborators. We employ an approach I call "critical constructivism." In this talk I want to show that this approach is in fact deeply rooted in Marxist method. I also believe it has significant political implications I will develop in conclusion.

A prominent communication researcher, Leah Lievrouw, writes in the preface to the book that in recent years, "media studies, cultural studies, and new media scholars have routinely disavowed the...powerful-effects view of communication technology that pervaded so much of mass media research through the 20th century, in favor of culturally situated, subjectively experienced accounts of media development and use." There is a move toward more empirical approaches including constructivist approaches.

Critical constructivism differs from the kind of generalized impact or "powerful-effects" studies we are familiar with in the writings of Adorno and McLuhan down to Castells and much recent postmodern theory. The emphasis on experience also distinguishes critical constructivism from political economy. While undoubtedly useful as partial accounts of technology, impact studies and political economy tempt some commentators to over-generalize. They then produce utopian or dystopian discourses: either we are headed toward a universal mind or a corporate dominated matrix. There is no time in this short talk to engage in debate with these alternatives. Instead, what I would like to do is to show how critical constructivism relates to some of Marx's most interesting ideas on methodology. Everyone is familiar with Marx, the political economist, but I want to introduce you to a different Marx, Marx, the social constructivist critic of technology. He is going to help us study the Internet as an incomplete technology and a terrain of struggle.

When Marx wrote most technology was deployed in factories and therefore most struggle over technology was class struggle. My intention is to generalize Marx's approach beyond the factory setting to which he applied it. Today technology is everywhere including social domains remote from production. Administrative hierarchies that increasingly resemble capitalist management everywhere accompany technical mediation. Hence today struggles over technology and its effects may break out far from the factory. Critical constructivism attempts to incorporate these struggles into a loosely Marxist framework.

I will begin by discussing four short passages from Marx that illustrate his method.

All constructivist approaches, including mine, agree that technologies are products of social actors whose interests and worldview influence their form and use. Marx adds something that is often missing in constructivist accounts: a reference to the strategic significance of technologies in class struggle. In *Capital* he claims that science "is the most powerful weapon for repressing strikes, those periodical revolts of the working class

against the autocracy of capital." And further, that "it would be possible to write quite a history of inventions, made since 1830, for the sole purpose of supplying capital with weapons against the revolts of the working class." Marx is referring to the well-known strategy of deskilling, employed to reduce labor costs and enhance control.

The transformation of production methods initiated in the manufacturing phase of capitalism responded to a specific concept of progress. This concept was described by Andrew Ure in 1835, at a time when it was still possible to talk honestly about class. Ure wrote, "By the infirmity of human nature it happens, that the more skillful the workman, the more self-willed and intractable he is apt to become, and, of course, the less fit a component of a mechanical system, in which, by occasional irregularities, he may do great damage to the whole. The grand object therefore of the modern manufacturer is, through the union of capital and science, to reduce the task of his work-people to the exercise of vigilance and dexterity."

In the terminology I've introduced Ure is here defining the "technical code" of capitalism. By this I mean the rule under which a type of artifact or, in this case, a whole domain of artifacts is designed. Technical codes translate ideologies, worldviews and interests into technical specifications that can be implemented by engineers or other experts. The translation hides the social significance of the codes behind a veil of supposedly technical necessity. The task of critique is to reverse the process and reveal that significance.

In the case of the Internet deskilling is still relevant in certain contexts such as online education. However, several other technical codes prevail as well and shape the Internet, for example, the relative publicity of personal information and communications as compared with other spheres of life. This code lies at the intersection of the demands of millions of ordinary individuals to display themselves in public, the desire of corporations to control employee communications, and the requirements of targeted advertising. The coincidence of these social demands has eroded traditional private/public boundaries. This has occurred in the face of attempts by some users to transfer the old boundaries to the Internet through encryption and anonymizing servers.

The second passage I will discuss is found in the "Introduction to the Critique of Political Economy." There Marx writes that "The concrete is concrete, because it is a combination of many objects with different destinations, i.e. a unity of diverse elements. In our thought, it therefore appears as a process of synthesis, as a result, and not as a starting point, although it is the real starting point and, therefore, also the starting point of observation and conception."

This rather enigmatic passage anticipates the genealogical method Foucault derives from Nietzsche. The basic idea is that social "things"—artifacts, institutions, etc.—are not substances but assemblages of various component parts held together by their functional role in society. They may disaggregate and combine differently as society changes. Money, for example, is differently constructed and has a different functional role in the Middle Ages as contrasted with the 19th century or today. It is not composed of the same "stuff" nor does it do the same sorts of things, and yet it is still called "money." The history of this artifact must trace these deep changes rather than

postulating a fixed substance with a definite essence undergoing external events of one sort or another.

The genealogical approach is plausible in the case of technologies. The telephone, for example, retains its identity although practically every component and many usages are quite different from what they were at the time of its invention. This approach to historical study is especially useful where the technical code imposed by the dominant actor is not alone in shaping design. Technologies are complicated then by the multiplicity of interests they serve. These various interest show up in design as more or less coherent assemblages of structures and functions. Many technological artifacts thus display some of the ambiguity we associate with social institutions despite their apparently rational form.

Critical constructivism expresses this complexity through the notion of layers. Technologies are concrete in Marx's sense because they realize in technical form various layers of function and meaning. This is apparent today in the many technologies that have been redesigned in response to regulation, starting out from a form that expressed a uniquely capitalist logic. The automobile for example is constituted by layers of environmental and safety regulation that supervene on designs originally introduced exclusively on the basis of market considerations.

Unraveling the layers is complicated by the fact that technical innovation often succeeds in combining multiple functions in a single structure. This process, called concretization by Gilbert Simondon, is an immanent criterion of progress in the evolution of individual artifacts. Simondon's examples are apolitical, such things as the air cooled engine which combines the dissipation of heat and containment of the pistons in a single structure, the engine case. The constructivist version of this theory shows how technologies have assembled and concretized a variety of functions in their structures to satisfy changing demands and power relations of the various influential actors.

A third passage of interest appears in *The German Ideology*. Marx introduces the intriguing notion that the capitalist appropriation of the productive forces, i.e. technology, produces the individuals *qua* individuals by breaking their fixed lifetime relation to particular tools or circumstances. Where formerly individuals acquired specific powers through long apprenticeship, under capitalism the individuals' labor is reduced to merely mechanical functions they can be trained quickly to perform in relation to a wide variety of technologies. For the first time they are released from subservience to a profession or place. Marx calls this "individualization." It opens democratic possibilities based on equality in contrast to premodern political orders based on estates with different rights and powers.

At the same time, it objectifies the totality of human capacities in machines. Thus technology is not just a means but also a reflection of the development of human nature as it transforms itself in transforming the world. Every feature of technology must therefore be traced back to the humanity it serves. Technology in a sense represents the corresponding aspects of its users.

This is where the problem lies: capitalism alienates the individuals in transferring their knowledge to machines and deskilling their labor. Capacities the individuals used to

possess are lost to them and the new ones they acquire are trivial and inhuman. Socialism would consist in the seizure of the mechanical forces of production in order to transform them into true instruments of human initiative. The individuals would acquire generalized skills at using the mechanical forces of production, giving them wide access to the technical heritage. The appropriation of these forces by the individuals under socialism “is itself nothing more than the development of the individual capacities corresponding to the material instruments of production. The appropriation of a totality of instruments of production is, for this very reason, the development of a totality of capacities in the individuals themselves.”

In sum, the stakes in the class struggle are not merely economic but concern the form of individuality or subjectivity available in the society. Under capitalism the capacities objectified in machines replace individual capacities. Under socialism the objectified capacities will contribute to the development of the individuals. In Marx class interests mediate the struggle between these alternatives. Today, the application and appropriation of technologies is pursued in a variety of contexts, each one of which is an expression of human capacities.

To belong to such a technically mediated world is to have specific interests that flow from participation in the opportunities it opens up and the problems it causes. I call these “participant interests” on the analogy with Marx’s “class interests.” The alienating effects of capitalist appropriation are felt in certain of these contexts. We will see that other kinds of interests besides class interests may be engaged in contemporary struggles over the control of these various types of technology. The alienating effects of capitalist appropriation are felt in certain of these contexts. We will see that other kinds of interests besides class interests may be engaged in contemporary struggles over the control of these various types of technology.

Finally, I will introduce a passage which has a bearing on the relation of function and meaning. Marx writes “A negro is a negro. He only becomes a slave in certain circumstances. A cotton-spinning jenny is a machine for spinning cotton. Only in certain circumstances does it become capital. Torn from these circumstances it is no more capital than gold is money or sugar the price of sugar.” This passage distinguishes the thing qua thing from the meaning it takes on through its economic function. The meaning thus acquired is not merely subjective although it is subjectively apprehended. At the level of everyday experience functions are in fact meanings. The chair has a function as a thing on which to sit only in so far as it is recognized as a chair, that is to say, only in so far as its meaning is apprehended by potential users who interpret what they see as a chair. But since economic function is also a place in the system of economic relations it has real effects in the world.

While Marx identifies meanings with economic functions, critical constructivism generalizes his approach to social meanings of all sorts. This broader concept is appropriate since the economy no longer serves as the main source of meaning if it ever did. For example, goods such as automobiles and mobile phones mark their owners style and status in the cultural system, quite apart from their economic function. Cultural aspects of consumption did not concern Marx, given his focus on the laws of the

economy, but culture is obviously of great significance today. Nevertheless, Marx's basic insight is valid, the notion that things become what they are in society through their relation to a totality.

This principle has important applications in critical constructivism since the interventions of actors in the evolution of technologies often alter their meanings and thereby introduce a different range of functions that orient their future evolution. The French Minitel system is an example. An information utility was perceived by hackers as a potential communication medium. This is a case of what is called "interpretive flexibility" in technology studies, the ability of actors to reinterpret technologies as they innovate new usages. The hackers and soon millions of users layered the Minitel with communicative functions that transformed its meaning from an instrument of social rationalization into a sort of electronic singles bar. This change was not merely subjective, not merely in the heads of users, but was reflected in the introduction of a raft of new software on the system. It also had important economic implications since soon nearly half the time spent on the system was spent chatting online.

This example drawn from the history of media begins to suggest how critical constructivism approaches the Internet. Rather than focusing directly on impacts or ownership, this approach begins with the shaping of design. The interventions of the influential actors intersect and interact with unpredictable consequences. The result may block some familiar affordances and bring out others that lay undetected until new actors discovered them.

Actors have a variety of resources they can bring to bear to further their interests through design. Ownership is of course an important resource, overwhelmingly so in the case of production technology as Marx observed, but it is not the only resource and is sometimes overshadowed by cultural and political factors in domains where the market is less central. The outcome of struggles over technology shapes the framework of everyday life for everyone in the society. It is so basic that it quickly becomes invisible until new challenges force actors whose interests are institutionalized in design to defend them.

In sum, critical constructivism generalizes from four methodological principles found in Marx. The idea of capitalist deskilling as determining a trajectory of technological development is generalized in the theory of technical codes as standardizations of actors' goals. The idea of the concrete object as a synthesis of determinations is generalized in the genealogical notion of the layering of technological design in the course of development. The idea of the objectification of human capacities in productive forces is generalized by relating the growth of capacities to a wide variety of technologies. The interpretation of the meaning of social objects through their economic function is generalized through multiplying the contexts within which objects take on meaning and function. Together, these generalizations lay out the basis of the critical constructivist approach.

I would like now to show how these principles apply in the case of the Internet, drawing on the research of my former students and collaborators documented in our new book.

Considered as a technology, the Internet is less unique and original than we often imagine. It is neither the first nor the only version of computer networking, just by far the biggest. It was only one of many systems until its triumphant march to planetary dominance in the 1990s. The Minitel system, for example, which opened in the early 1980s was the first successful domestic computer network. It eventually accumulated over six million users, an enormous number for the time.

Networking originated in timesharing on mainframe computers. Connecting many terminals to a single mainframe, connecting many minicomputers, or as with the early Arpanet, connecting several mainframes was at first seen as a way to economize expensive computer time. But the users of these computers were also inadvertently connected. They discovered and enjoyed the opportunity to communicate. Thus communication on computer networks appears as a side effect of the economics of computing. The communicating subjects can be considered as actors who introduced a communicative layer on top of the original computational layer.

With the introduction of software for instant messaging and e-mail this secondary layer was incorporated into the design of the network. Finally, we see in cases such as the Minitel and the Internet, the proliferation of communicative usages alters the meaning of the network and through it that of the computer as well.

A number of socially significant features characterize the virtual world established on the Internet. Among them I want to discuss five briefly: non-hierarchical structure, anonymity, mass coordination, data storage, and online community. These are some of the main affordances actors work with and incorporate into layers representing their interests. Their success at doing so determines the meaning of the network.

The non-hierarchical structure of the Internet contrasts with earlier forms of computer networking based on the X.25 protocol. That protocol centralized control in the hands of operators such as Telecoms. This had distinct advantages from a business perspective as contrasted with the Internet protocol. For example, the French Telecom could track Minitel users' online access to services to the minute and to bill them accordingly. The Internet is quite different. There is no central control and this has had two major consequences: the network has been able to internationalize easily, and experimentation has flourished.

The non-hierarchical structure of the Internet has made possible anonymity not only in social interaction but at the network level itself. Anonymity reverses the usual relationship between the codes of self presentation and interaction. Identity appears as the outcome of interaction rather than its presupposition. There are of course other venues in which this is the case, such as bars, and we can ride a bicycle without identifying marks. But the Internet spreads the practice of anonymity on a mass scale for a wide variety of purposes, some good, others bad. Anonymity on the network supports various forms of antisocial, stigmatized or illegal activity, such as access to pornography, coordination of criminal and terrorist activity, new forms of personal encounter, and political protest.

From a political standpoint the most interesting positive consequence of anonymity is its contribution to resistance movements. This point is closely connected to the potential for mass coordination offered by computer networks. Anonymous agitators

can assemble huge demonstrations quickly and cheaply even in conditions of severe repression. (Such significant political usages are of course distinct from the mere signing of online petitions or commenting on news articles.)

Anonymity on the Internet is not perfect. Computers store records of their own activity, including those of individuals in communicative relationships. This feature makes it possible to track individual and group behavior to some extent. Unprecedented depth of surveillance is possible on the basis of data storage although complexity and costs do limit the advantages of this feature. Just as anonymity has proven particularly useful to dissenters, so surveillance has been applied primarily by dominant actors such as governments and corporations. The personalization of advertising is one familiar application. Occasional exceptions such as Wikileaks have turned the tables on the powers that be. Data storage can, however, also be incorporated into the usages of individuals and online communities where it serves to preserve their history.

These first four features illustrate the ambiguity and contingency of technological design. Various combinations of the features and corresponding usages have different social meanings and consequences. Anonymity can be appropriated to disseminate commercial pornography or to disseminate revolutionary propaganda. The non-hierarchical structure of the Internet has democratic implications but it also makes it useful for criminal activity. And so on. In each case users layer the technology with their demands, often modifying the software running on the system accordingly. This is not to say that the Internet is a “neutral tool” but that its affordances can be combined and appropriated in a variety of ways by various actors. Each appropriation opens a distinct developmental path that may turn out to be more or less influential in the future. To paraphrase Marx, “The Internet is a machine for transmitting data. Only in certain circumstances does it become capital, or alternatively, a democratic medium, a sex machine, etc.”

Finally, a fundamental innovation of the Internet is its ability to assemble small groups for discussion and deliberation. This is in fact the first effective electronic mediation of small group activity. It makes possible new forms of sociability such as online community. Since so many important human activities go on in small groups, activities such as education, work and political discussion, this is a major social innovation with huge consequences. Yet it is often overlooked in analyses of the Internet. Its uniqueness emerges clearly from a comparison with other types of communication.

Regular mail links pairs of correspondents asynchronously without electronic mediation. Each correspondent has a paper record of the communication which must be filed locally for future use. The telephone enables pairs of individuals to communicate reciprocally in real time but normally leaves no record. Broadcasting supports one-way communication to a passive audience. By contrast with all these earlier forms, small group communication on computer networks is reciprocal and recorded. The concretization of sending and filing of messages is crucial since this is what assembles groups around a virtual locale, the file to which messages are sent.

Community is the primary scene of human communication and personal development. It is in this context that people judge the world around them and discuss

their judgments with others. Any technology that offers new possibilities for the formation of community is thus ethically and politically significant. But are online communities real communities, engaging their members seriously? Some impact studies cast doubt on their authenticity and there are certainly online “communities” that are communities only in the dubious sense in which Facebook “friends” are friends. But this is not the whole story. The testimony of participants as well as extensive research confirms that the Internet is the scene of new forms of sociability that strongly resemble face-to-face community in terms of loyalty and commitment.

The confusing mix of all these features on the Internet today results in many layers of meaning overlapping and conflicting. This is characteristic of an immature technology. In the normal course of technological development, closure is reached around a single technical code which then orients the future evolution of the artifact. This has not yet happened with the Internet. There is no single design or model that defines the technology but competing layers of meaning and function that combine different affordances of the medium for different purposes. While the scope of the struggle between these alternatives is not comparable with the proletarian movement Marx observed, it recapitulates the main features of his method, as described here.

Two main alternatives are in contention today, a consumption model and a community model. Each represents a technical code that may someday determine the overall design of the Internet and its evolution. The consumption model follows the logic of consumer society in objectifying human capacities in commodities. By contrast the community model supports new forms of sociability through which the individuals may appropriate alienated aspects of their lives. The struggle between them plays out in many venues that are not normally considered “political” but which do indeed have political significance. Both the meaning of the Internet and what it is to be an individual in an Internet enabled society are at stake. A critical theory of the Internet must acknowledge the struggle rather than assuming it has already ended with the victory of business or government or some ill defined notion of democracy as do many current approaches.

The consumption model has two main features today, both dependent on data storage. Because data on online activity is available, searching can create a new type of market that inexpensively links up people and goods over a global territory. The most profitable Internet businesses resemble eBay in stocking little or no inventory, but in delivering a smooth connection between supply and demand. Data mining information voluntarily supplied by users in forums such as Facebook has also revolutionized the advertising industry and supplied most of the commercial funding of the Internet.

The consumption model has enormous potential for growth because film and television have not yet been fully adapted for delivery over the Internet. We can expect a huge boost in consumption usages when every sort of recorded entertainment is readily available. Already this prospect is pressing on the legislative agenda of the United States government. Entertainment companies and Internet service providers are anxious to obtain the legal right to convert the Internet into an enhanced version of television by privileging high speed delivery of entertainment over other functions.



This would mean the end of “network neutrality,” the current practice under which all types of communication are treated equally. If the companies prevail, the Internet may soon see far less communicative and public usages as bandwidth is monopolized by profit making enterprise. While so far this is primarily an American debate, its effects would be felt worldwide, as was the case with the Digital Millennium Copyright Act. Further development of the technology would undoubtedly follow along lines determined in the US for years to come. The triumph of the consumption model would transform both the dominant interpretation of the system and its technology.

Some social critics already dismiss the democratic potential of the Internet. To get an idea of just how far we are from the corporate dominated horror they imagine the Internet to be, let’s imagine this transformation. Were the consumption model to succeed in imposing its requirements, gradual modification of its protocols and delivery systems would place the Internet at the disposal of the corporations and government. Tight regulation of intellectual property and security controls necessary to reliable delivery of goods would eliminate anonymity, with consequences similar to the government censorship already in place in China and some other countries. “Self-willed and intractable” users would be prevented thereby from “doing damage to the whole.” The restriction of free communication by regulations and fees would limit the Internet’s ability to support small group activity for purposes other than business. The “totality of capacities” represented by the Internet as an objectification of our humanity would be alienated under the sort of centralizing technical code characteristic of other mass media. This is precisely the sort of alienating appropriation Marx identified in the organization of the factory, but it has not yet happened to the Internet.

Fortunately, the Internet is not yet dominated by business but by users whose free communication prevails in cyberspace. The two main types of personal communication are individual email and various forms of group communication such as social networks. The essence of the community model is reciprocity. Each participant is both reader or viewer and publisher. To maintain this structure, the community model requires the continued neutrality of the network so that non-professional, unprofitable and politically controversial communication will not be marginalized. It must be possible to introduce innovative designs for new forms of association without passing through bureaucratic or commercial gatekeepers. The involvement of open source developers and other unpaid volunteers is essential and would not survive a commercial take-over of cyberspace. Embedding a strict regime of intellectual property in the technology of the system would be incompatible with free communicative interaction.

The conditions of community are both social and technical. Should the community model prevail, commercial, entertainment and informational applications would certainly find their place, but they could not dominate the evolution of the system with their special technical and legal requirements. Indeed, so far business seems to be adapting to the requirements of community: the commercial operation of community sites turns them into advertising platforms without determining their communicative content. In effect, business now operates these sites as a common carrier, not so different from the

telephone network. This is why the Internet continues to have political significance even as business encroaches on it more and more.

The list of political activities on the Internet gets longer and more impressive every year, starting with the Zapatista movement in Mexico and continuing with the protests against the WTO and the IMF, the world wide demonstrations against the War in Iraq and the Occupy movement. The Internet also plays an important role in electoral politics, first coming to attention with Howard Dean's campaign and finally paying off in the election of Barack Obama. The recent Arab revolts should be proof enough of the political potential of the Internet. In all these cases the Internet has broken the near monopoly of the business and government dominated official press and television networks by enabling activists to organize and to speak directly to millions of online correspondents.

This is not to say that the Internet is responsible for the political movements and events in which it plays a role. It is merely a medium of communication and coordination comparable to Ayatollah Khomeini's cassette tapes or the leaflets of the revolutionary students of 1968. It improves on these earlier media in terms of speed and range, but it is not itself a movement or a revolution, nor does it guarantee their success.

These examples seem to me to provide strong evidence for my view of the Internet as a conflicted but politically significant technology, but they are not enough for Darin Barney, who argues that "these alternative and resistant practices still represent a tear in a salty sea of hegemonic encounters with the broad scope of digital technology and its culture. To take the measure of the present conjuncture we need careful work that documents and even promotes tactical political uses of these technologies, but we also need to place these uses in the broader context of what remains a very powerful set of technologies configured to advance and secure what Jacques Rancière has described as the 'unlimited power of wealth'".

To answer objections such as this, a theoretical framework must give the political Internet substance. After all, as Barney suggests, political usages might be exceptional and the Internet defined by narcissistic self-advertisement and business. My main concern in what follows is to develop a coherent alternative to such critical assessments. To anticipate my conclusion, I argue that politics on the Internet is the tip of the iceberg, arising in the midst of a broader revival of agency in many different types of online communities, and that it deserves our full attention and, indeed, our support. These new forms of agency redefine and enlarge the public sphere. What we commonly identify as politics on the Internet is an instance of this broader phenomenon. To understand this new politics we will need to reconsider how we think about technology once more.

While Marx identified the objectified capacities of the individuals with production technology, today advanced technological societies assemble collectives of geographically scattered individuals around technical mediations of all sorts. Educational activities, work, entertainment, illness, even externalities such as pollution create shared worlds in which the individuals circulate just as much as they do in factories or local communities. These shared worlds reflect aspects of the individuals' being as did the machines that interested Marx.

Consider, for example, a particular disease as a link between its victims and the medical institution. The patients may live far apart but they share a connection through that institution. The connection may remain latent where the patients have no sense of common concerns and no means of communication. However, it can also be activated where they come together as they often do today on the Internet.

To the extent that these worlds are owned and/or managed by a hierarchical administration modeled on capitalist management, they alienate participants as did factories in Marx's day, although generally with less dramatic consequences. Consider again the case of patients discussing their interaction with the medical institution on the Internet. They may be well served, but where they are not they are likely to come up against a rigid bureaucracy that will only yield under considerable pressure. Communication and organization is the key to applying such pressure and so the Internet can play a role.

The most innovative aspect of the Internet is its capacity to support such collective reflection on participant interests in all domains of life. This is the central theme of Maria Bakardjieva's contribution to *(Re)Inventing the Internet*. She explains the emergence of new forms of community among Internet users in response to a wide array of civic problems and frustrations. Bakardjieva calls this "subactivism," a kind of pre-politics that involves agency in relation to institutions such as the medical system, government agencies, and schools. She delineates the shifting boundaries between the personal and the political, the "small world" of everyday life and the larger society.

Several chapters of this book show how online communities in specific settings have begun to use the Internet to coordinate their demands for a fuller representation of participant interests. Despite discouraging developments in other domains, agency in the technical sphere is on the rise. These new forms of online politics extend activity in the public sphere to technical issues formerly considered neutral and given over to experts to decide without consultation.

The chapter on online education by Ted Hamilton and myself describes its development since its invention in the early 1980s. Only online discussion was possible then and so a pedagogy based on dialogue and collaboration was developed. Later, university administrations were attracted by the still unfulfilled promise of automated learning on the Internet. The deskilling of higher education seemed within reach. The collapse of that project has left a confusing situation in which online education means very different things to different people.

The communicative potential of online education represents a great improvement over the one way model of traditional distance learning. Many adult learners who would not be able to study in a traditional university sign up for online courses where formerly they might have received packets of "learning materials" in the mail. For on-campus students, online education offers opportunities for discussion as a supplement to lectures held in a conventional classroom setting. This too seems an improvement over the traditional large lecture course. Nevertheless, there is a risk that because it is a new and poorly understood technology, online education will provide a cover for the reduction of education to the mechanical delivery of texts and videos. Teachers' unions and faculty

senates have intervened in protest. The struggle over the future of the Internet is paralleled by this controversy over how best to employ it in education, either to constitute educational communities or to distribute information and deskill the teaching corps.

The video game industry offers another example of the complex interactions that characterize the Internet today. The industry is now larger than Hollywood and engages millions of subscribers in online multiplayer games. The players' gaming activities are rigidly structured by the game code, but online communities organize them in informal relationships that the industry does not control. The "ludification theory" Sara Grimes and I present explains how these communities form within and in reaction to the rationalized structures of game technology.

Once activated, the community struggles to reconfigure aspects of the game, mobilizing code and game items in new ways and contexts. Markets appear in goods won during play as players auction them off for money. Users find work-arounds to avoid restrictions on speech or activity. Games are modified by players skilled at hacking. Companies may protest these unauthorized activities but in the end they usually give in and attempt to co-opt what they cannot control. Interaction between game designers and players and among the players themselves creates an adversarial environment unlike the typical mass audiences created by television broadcasting. Similar phenomena have been observed on other mass sites such as Facebook, with members intervening to protest or demand changes in policies.

The representation of technically mediated communities is complicated by the role of experts in the creation and operation of technical networks. Experts represent the community constituted by a technical network in the sense that they implement some of the participant interests of its members. But expertise is based on technical knowledge, which, like technologies themselves, is underdetermined and realizes specific social interests in technically rational forms. These bodies of technical knowledge transmitted to successive generations of experts contain the outcome of past struggles over design. Current designs are responsive to this technical inheritance and the agency of participants bringing pressure to bear on those in control of technology.

In her chapter, Kate Milberry discusses this aspect of the Internet as it has been addressed by "tech activism." The emergence of a cohort of self-taught radical experts on the technology of the Internet opens up new possibilities. Milberry examines how and why these tech activists appropriated wiki technology, using it as a space and tool for democratic communication in cyberspace. In turn, this has enabled the realization of new communicative practices offline, establishing a dialectical relation between technological experts and the social world they serve. Democratic practice online prefigures a more just society in which democratic interventions into the development and use of technology are consciously organized.

Politics is no longer the exclusive affair of traditionally constituted political groups debating the traditional issues. The range of issues and groups is constantly widening in unpredictable directions. The return of agency on the Internet may appear non-political but what is democracy if not the activity of individuals in determining their own collective life? And to the extent that so much of life is now mediated by

technology, more and more of it becomes available for these new forms of democratic intervention. That is, if the community model of the Internet survives. This is the ultimate challenge for online community: to preserve the conditions of community on the Internet. That depends on the capacity of ordinary users to defend its democratic potential in the coming years.

The movements to which this gives rise are still quite weak and lack an overall strategy of change. But the unfavorable comparison with earlier proletarian movements should not blind us to subtle changes taking place in the conduct of politics and the nature of the public sphere that may yet shape a new era. At the very least these changes testify to the significance of traditional political movements supported by the Internet, which cannot reasonably be dismissed as exceptions to the rule of dystopia. Technology will not decide the future of the Internet but rather human action. When technologies are understood as terrains of struggle rather than as fixed and finished things, they are dereified and exposed to criticism and transformation.

I want to conclude by reflecting briefly on Marcuse's responses to the politics of technologically advanced capitalist society as he observed it in the 1960s and '70s.

Marcuse proposed two different strategies at different times. The "Great Refusal" was an aesthetic principle he extended in the early 1960s to one-dimensional society as a whole. This strategy recapitulated old debates that opposed reform to revolution in the absence of a movement. Uncompromising and absolute critique was an attractive stance in the context of a society rich enough to coopt almost every demand. But ironically the search for the uncooptable demand led to Marcuse himself becoming an icon in the mass culture of 1968, a fact from which his reputation suffers to this day. In the contemporary context, the dystopian critique of the Internet inspires a similarly uncompromising refusal. But it overlooks the actual struggles taking place today.

Significantly, once conditions changed Marcuse did not persist in the Great Refusal. A new configuration emerged in the 1970s which Marcuse called the "preventive counter-revolution." Cooptation continued but supplemented by recession and repression. The New Left disintegrated, but it had created a large critical public and a sense of suppressed possibilities. Marcuse now echoed the German slogan, "A Long March through the Institutions." In a time of political eclipse one must find a place in the institutions of society. But if it is possible to bring contestation to bear on those institutions, that is the task, accepting the likely ambiguity of the outcome. Total refusal is no longer the touchstone of a revolutionary stance.

These two strategies exemplify two different styles of critique. The Great Refusal is a disappointed response to the failure of socialist revolution. The Long March reflects a conception of permanent struggle with neither a foreseeable horizon of victory nor a reason to give up. The obstacles capitalism places in the path of the good life are addressed piecemeal today. The system as a whole is not the object of resistance. Even if it could be abolished, we now know from the experience of the communist world that the reified institutions that it has instituted would continue to exist in other forms and continue to call for resistance. However, this is not a dystopian society but one in which agency is exercised in ever new forms. The task of critique is to inform that agency, to, in

Marx's words, "explain to the world its own acts," showing that actual struggles contain a transcending content that can be linked to the concept of a rational social life.