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The Computerized Academy

Matthew B. Crawford

Anyone who has suffered a power outage while writing knows that sudden feeling of helplessness that comes with losing one's word processor. Put aside the trauma of seeing one's unsaved work disappear forever, or the paralysis of not being able to conduct instant research online. Even for the activity of writing itself, pen and paper just don't feel right anymore. The word processor's great ease of revision liberates one from inhibition, reduces the burden on one's working memory, and seems to shift the editorial process from internal reflection to a place external and visible—the computer screen.

But how often do we consider the ways that information technology (IT) alters our manner of thinking? The significant benefits of IT for academic life are perhaps obvious. In the natural sciences, entire research programs are predicated on the "mining" and analysis of data made possible by IT, allowing investigators to unearth patterns beneath the noise of ordinary experience and beyond the limits of a scholar's own narrow experiments or discipline. In the social sciences, economists have adopted similar techniques to generate highly counter-intuitive hypotheses about mass behavior. In cognitive psychology, unique among the social sciences in that it relies on the controlled experiment, computers have made manipulation of stimuli, randomization of subjects, and statistical analysis so cheap and easy that students can perform real experiments of their own. This gives them a taste of science as an intellectual process, rather than a set of doctrines distilled in textbooks.

For humanists no less than scientists, e-mail has been a boon to the informal exchange of ideas, with benefits that are probably incalculable. The advent of the PDF means that instead of requiring students to wait for hours outside the reserve reading room of the library to check out articles, a professor can distribute texts electronically. The popular software Blackboard allows professors to create a Web page devoted to the

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course, with links to readings and a forum for students to continue discussions outside the classroom. Scholars without access to a good library, whether at small colleges or in poor countries, can get the full text of an increasing range of materials over the Internet. Searching the literature in one's field has become less time-consuming (or, with a given amount of time, more comprehensive) by perhaps an order of magnitude. In brief, IT has made many old tasks easier, many new things possible, and many aspects of teaching and learning far better.

The Search-Engine Classicist

Yet one can also ask if things have gotten too easy, and whether this great facility of intellectual production and exchange leads to facile consequences, reducing as it does the period of mental gestation. The pace of academic life comes to resemble that of commercial life. Tocqueville writes that "Nothing is more necessary to the cultivation of the advanced sciences or of the elevated portion of the sciences than meditation." But in America, the general agitation of the democratic social condition (mobility, competition, insecurity, practicality) "influences the judgment of men who cultivate the sciences; it persuades them that they can succeed at them without meditation or it diverts them from those sciences that require it." IT seems to amplify such tendencies, and the academy's embrace of IT is perhaps a response to the same pressures that Tocqueville noticed long ago. If Tocqueville was right to find American academic life conforming to the same gestalt as American society generally, the resemblance has only gotten closer in recent years.

For example, say you're a classicist writing something on friendship in antiquity, a task that certainly calls for meditation. The bulk of all ancient literature is now available online in the original languages, and fully searchable. So you type the Greek word for "friend" into a search engine and see what turns up. Connections are easy to find; threads can be followed where they never could have been followed before by a busy junior faculty member, back when following such lexical and conceptual threads required a deep knowledge of the various literatures traversed. You are now armed to display an erudition that you know is superficial, so there is a bad conscience involved. But you need this publication before your mid-tenure review, and there is no way you are going to find the time to read the entirety of these works. You've got the passages you need to stitch together a novel thesis. This web-enabled manner of research seems to reflect the postmodern spirit of levity, so you console yourself that your

method is intellectually hip. This prevailing spirit authorizes you to traduce literary wholes, the conceit being that the virtuosity of the scholar has a higher standing than the intention of the author studied. The web is a perfect handmaiden to such light-minded virtuosity.

But beneath the levity are some rather unmirthful facts, the sort a grizzled old Marxist would call "structural." As everyone knows, there are simply too many Ph.D.s. Labor market forces intrude where they are unwonted, and with them come the pressures to produce widgets (or research papers) more efficiently, lest the floor boss take away your shifts. Here is an economic basis for postmodern levity in scholarship. Pitiably, and for reasons beyond their control, junior faculty resemble more than ever Tocqueville's portrait of insecurity; whether one likes it or not, scholarship becomes a means to an end, the way to advance, not to the corner office but to that state of leisure and security called tenure. Tenure removes the pressure, but by then certain habits of mind have taken root.

If one takes for granted the fast pace and cut-throat competition of contemporary scholarship, the attractions of IT for the professoriate are clear. And in comparing the scholarly products of one age with those of another, it is perhaps largely a matter of taste which one prefers. Few today would dispute that many of the Victorian classicists, for example, had blind spots and prejudices that are now quite embarrassing. But the gentleman-scholars of less democratic ages worked at leisure, and it is at least plausible that the slow pace of their investigations, unaided by machines, allowed for a ripening of understanding in some of them—a ripening that is hard to sustain in the information age.

The Scientist as Programmer

The effect of IT on research in the natural sciences is somewhat different. Graduate students in physics sometimes complain that their research experience consists of little besides computer programming. This has its basis not in economic pressures (which are less severe in their case; they have non-academic options), but in the nature of the intellectual problems they confront. For example, the wave equation for the quantum-mechanical model of a multi-atom molecule cannot be solved using symbolic math with pencil and paper; it can be solved only "numerically," that is, using computers. If the mathematicization of nature inaugurated by Galileo and Newton entailed the first abstraction away from ordinary experience (we observe no frictionless surfaces, for example), this more recent *numerization* of nature takes abstraction to another level, and the human satisfactions of science become more

elusive or perhaps simply different. The pleasures of physics are in substantial part the pleasures of gaining physical intuitions by doing mathematics: as with pure math, every step of the construction is under one's control, and visible in perfect clarity, yet the result sheds new light on something visible in the external world, something *not* of one's own construction. This is an extraordinary experience. But when our knowledge of nature reaches the limits of our ability to do symbolic math, further advance requires the brute force of number-crunching, which is literally a mechanical process.

Of course, *programming* the computer is not a mechanical process. A graduate student who spends his days and nights programming is essentially engaged in logic; it is an algebraic form of reasoning. The pleasure of programming (for it is pleasurable, apparently) seems to be closer to that of pure mathematics than it is to science. Descartes, the first person to think rigorously about the place of mathematics in scientific method, expressed an opinion about logic and algebra that sounds strange to us: "[I]n the case of logic, its syllogisms and the greater part of its other lessons [serve] more to explain to someone else what one knows, or even . . . to speak without judgment concerning matters about which one is ignorant, than to learn them. . . . [I]n the case of algebra, one is so governed by certain laws and symbols that out of it has been made a confused and obscure art that encumbers the mind instead of a science that cultivates it." What is needed, according to Descartes, is to supplement these hermetically self-contained modes of reasoning with geometry, which better reflects the world of experience. My point is not to suggest that the use of computers in science is somehow wrong, but rather that those (mostly grad students) who have been consigned to spend most of their time programming are missing out on the full experience of doing science. One can't help but think they'd rather be rolling balls down an inclined plane. Yet they have arrived too late for that. Judging from what I have seen, their situation is not very happy, and accordingly one may speculate that in the future the sciences might attract a different sort of student. This student is not so much curious about the world he sees around him (he spends most of his time at his terminal) as he is entranced with the feeling of his own competence at manipulating code. This would be a disposition more willful than receptive, and by that token perhaps more deeply technological.

Students and Teachers

As we move from the realm of scholarship to the realm of teaching, and from the teacher-scholars themselves to their encounter with students,

the dilemmas of IT take on a different cast. Information technology has surely affected the student-teacher relationship, and here the effect of IT is perhaps more cultural than cognitive. For example, e-mail seems to lessen the threshold of social anxiety that must be overcome to initiate communication, certainly compared to a phone call or face-to-face meeting; and students are not shy about using it to query their professors (beginning their e-mails as often as not with "Hey," unsure of what salutation to use in a medium that seems unsuited to formality). As a result, professors are more accessible to students than they once were, and hence answerable to them for various small demands, from requests for lecture notes after missing a class to arguments about a grade. The overall effect is to lessen the sense of distance between student and teacher.

Consider, for example, the following true story, which illustrates not so much any particular effect of IT on academic life as the general ethos that seems to attend it: A student at a decent liberal arts college in the Midwest goes to her professor in the middle of the term and asks him where her grade currently stands. He says he doesn't know off the top of his head, but he'll e-mail it to her. So he does. She doesn't reply, but he's used to that. He used to think it was kind of rude. The next time he sees the student, she says: "You never sent me my grade." He says: "Sure I did. I e-mailed it to you." She says: "Yes, but you didn't average it for me." Puzzled at first, he says: "But it's simple arithmetic. How hard can it be?" The weight of each assignment was on the syllabus. A week goes by. She announces that she wants to take the class pass/fail (instead of receiving a letter grade) "because you belittled me." He feels a vague sense of menace. It's past the point in the term when such a change is supposed to be made, but he bends the rules. Feeling blue, the professor opens the college's internal homepage (it requires a university password to access) and clicks open "Last Man Standing," one of 15 video games maintained there. Noting by happenstance that his not-to-be-belittled student currently has the number three ranking on the game, he sets out to best her score and get some vindication, however feeble.

This is surely an odd story. But the characters are probably familiar to anyone who pays attention to contemporary academic life: the demanding yet fragile student and the submissive yet disgruntled teacher. The pushy consumer and the compliant employee. Many have noted higher education's creeping embrace of a commercial ethos, and its attendant transformation along the lines of a service industry. The professor's role is to provide a service for pay, and to do so congenially. In many ways, this is

an old problem—democratic antipathy toward hierarchy of any kind finds expression in the democratic classroom. Plato's Socrates described this phenomenon in the *Republic*: "As the teacher in such a situation is frightened of the pupils and fawns on them, so the students make light of their teachers, as well as of their attendants." But the advance of information technology presents some new twists on this old problem—such as granting students the power to rank and ridicule their teachers online, and the resulting power to choose courses based on this "market research." Online professor reviews turbocharge our democratic tendency in education.

The Ideology of Student Choice

If information is power, then this cliché needs to be supplemented with another: power corrupts. Let me focus here on an easy target, not because it is easy, but because it sheds an especially glaring light on the current state of relations between student and teacher. RateMyProfessor.com (RMP) is a popular website that allows students to rate their professors on four criteria: easiness, helpfulness, clarity, and whether they are hot or not. Professors who are hot get chili peppers next to their names. Typical positive comments on RMP are "really helpful outside of class" and "she's really fun!" Typical negative comments are "I had to work really hard and only got a B" and "boooooooring." At least one professor is praised for performing magic tricks for the students.

The site also has a number of banner ads. On a given day, two clicks will get you to ProfEssays.com, which offers "Custom essays and book reports written exactly to your needs within 8 hours." Moral qualms? Rest assured, "Each completed custom essay automatically goes through the anti-plagiarism software." The website offers this about the writers you will be hiring: "If our researcher do sophisticated research project for you, he/she sure has a head for it." And this: "Let professionals write custom for you." Not the most reassuring advertising copy, perhaps, but presumably the site's clientele is more desperate than discerning.

At one institution I know well, the university's own homepage directs users to a campus information site, called "The Hookup," which includes a link to RMP. The Hookup is a site "run by students, for students," but it shares the university's domain name and has a definite odor of officialdom (with information on campus housing and such), so the sexual connotation of its name is a little creepy. In the same passage on democratic education, Plato describes well this happy circle of congeniality: "The old come down to the level of the young; imitating the young, they are overflowing with

facility and charm, and that's so that they won't seem to be unpleasant or despotic."

Not surprisingly, universities have turned this deference to the young into a pedagogical theory. In the journal *The Mentor*, one observer who attends congregations of college administrators reports the following: "The first person to speak was a senior dean from a distinguished university. He announced proudly that he and his colleagues admit smart students and then make a special effort to 'get out of their way.' 'Students learn mostly from one another,' he argued. 'We shouldn't muck up that process.'" Students learning from one another is a respectably democratic-sounding formula, though one wonders why parents keep paying those aristocratic tuitions. And it is consistent with official deference to RMP, which allows students to use a sort of collective intelligence-gathering to choose their courses.

But in the end, the empowered students often feel bereft, like intellectual orphans, and come to wonder *post facto* about the choices they have made by their own collective lights. For example, in his book *Making the Most of College*, Richard Light reports that students who avoid science classes have not necessarily thought their decisions through seriously and later regret them—a conclusion he draws based on interviews with sixteen hundred Harvard undergraduates. "Students concentrating in the humanities were asked, just before graduation, 'What is your one biggest academic regret?'" he writes. "The question was asked in an open-ended format, inviting students to say just about anything they chose. The single most common response, with no prompting from the interviewer, was 'I wish I had taken more science.'"

In a recent issue of the *Claremont Review of Books*, Harvey Mansfield described this problem with great clarity, reflecting on the ideology of student choice and its discontents:

> Choice's advantage is that it is not imposed, or apparently not imposed; and students think better of the courses they take for having chosen them for themselves. You will be slow to diss the professor when doing so compels you to admit you were a fool for taking the course. This is psychology. But there is also a drawback to choice in its seeming promise that you will be satisfied. Lots of choice of food in the cafeteria easily makes students more choosy rather than more satisfied. . . . Despite the almost unbelievably large number of courses offered, finding that fourth course every semester gets harder and harder for students as they move towards graduation. Nothing is quite right for me; so I flock to courses that everyone else seems to like. This is the invisible author-

ity of democratic opinion that leads to frustration and grumbling and fosters the sense of being put upon, notwithstanding that array of choice.

It is a foundation of the American democratic self-understanding that one should rely on one's own judgment, not on the opinions of others. It is especially incumbent on us not to defer to *authority*. The very premise of the student-teacher relationship thus sits uneasily in our regime. Yet it is simply not true that we are capable of judging everything for ourselves. This puts the student in a sad and poignant situation. Enlightened doctrine tells him that he is equal to everyone else in discerning what is important. Since there is no longer much of a curriculum inherited from tradition and reflecting the judgment of the past, the full weight of responsibility for figuring out what is important falls on his own shoulders. But this burden is often too heavy to bear. Tocqueville suggests that in this situation, our inevitable reflex is to seek refuge in public opinion. As Mansfield puts it in his introduction to *Democracy in America*, "An individual looks around and sees many other people holding more or less similar opinions, and their similarity makes them more credible. What everyone thinks must be so! At the same time, no particular person claims responsibility for these common opinions; so no one's pride is at risk in adopting them."

The Invisible Hand of Fools

When the reputation of professors and courses was based on the unsystematic propagation of gossip, one could take into account the character of the source—the opinion of a known fool could be discounted. But the ratings at RateMyProfessor.com are anonymous. Every contributor has the same status. And what was previously communicated inefficiently by hearsay and gossip is now systematized and quantified: a professor is rated from one to five on each criterion, and the ratings are averaged. With reduced information costs as education consumers, students are more likely to let their preferences be influenced by those of their peers.

Traditional student evaluations are also anonymous, yet they are different in kind. In the first place, they are not made available to students. Standard course evaluations are intended for use in hiring and promotion of faculty by deans and department chairs. This is appropriate; faculty need to be given a career incentive—since a loftier motivation cannot be taken for granted—to take their teaching seriously. The usefulness of student evaluations to individual faculty depends on their ability to sort evaluations by type of student. Since they are anonymous, and rightly so, this

sorting is accomplished by asking questions such as, "What percentage of the reading did you do in this class?" If a student who did 30 percent of the assigned reading comments that your lectures were hard to follow, you're not likely to adjust your lectures to a lower level. But no such sorting is possible with RateMyProfessor.com. Neither students who read the reviews while shopping for a professor, nor professors who are interested in adjusting their teaching to the students, are able to control for the "lazy idiot factor." In this case, the IT ideal of giving a voice to the voiceless seems to render all voices indistinguishable, and therefore not very informative. The effect is to strengthen the influence of those who otherwise might not be listened to *for good reason.* Paradoxically, lowering some barriers to the flow of "information" makes it harder to form good judgments.

Traditional student evaluations are also "course evaluations" more broadly, not professor reviews. RMP treats professors as performers. Like theater reviews, RMP reviews proceed as though the man on stage is in charge of our relationship to the text; he gives us a sort of interpretive dance which may or may not be entertaining. On this model, which can only be called infantile, the student has no responsibility for what he brings to the encounter. Moreover, traditional student evaluations come only at the end of a term, after a student has gone through a whole process, the initial stages of which may be painful. The material of the course is allowed to ripen according to its season. There is a sequence. Some professors, like some subjects, are not immediately appealing, and their strengths are revealed only to those who are patient. The traditional student evaluation captures the students' *educated* opinion of the course and professor. RMP is to university life what instant polling is to politics: it elevates snap judgments over considered ones, and rewards professors who can deliver snappy sound bites in the first week of class. Once again, removing barriers (here, a time barrier) to the expression of opinion makes sound judgment less likely.

Of course, RMP fits perfectly with the ideals of *transparency* and *informed choice* that inform the broader Internet enthusiasm. These ideals seem to involve the dissemination of information, the removal of hierarchy and institutional gatekeepers, and the soliciting of previously unheard voices in the global village of the World Wide Web. If any institutional authority cannot withstand this, let it perish. Here the basic model for intellectual life is commerce: just as markets free of artificial restrictions produce ideal outcomes by the workings of a mysterious hidden hand, so truth will prevail in the open competition of the "marketplace of ideas."

But can an opinion be taken as true merely because it prevails? As a practical matter it is not clear how this conviction about the robustness of truth differs from simple deference to public opinion. The marketplace is where one goes to learn the authoritative opinions of a particular time and place. But if higher education is to be something other than mere socialization, then the distinction between knowledge and opinion would seem to be crucial.

RMP undermines this distinction by subjecting the intellectual standards of the teacher to a kind of popular referendum. To be sure, it makes the market for courses more efficient: supply becomes more sensitive to demand. But we must at least wonder what education will become—or already is—when it becomes so sensitive to the demands of those who are not yet educated.

Unfortunately, such uneducated opinions cannot simply be ignored by faculty, especially untenured junior faculty. One professor I spoke to was offering a seminar on the Peloponnesian War in which the students were to read primary sources, while one of his department colleagues offered a seminar on the history of sex in the cinema, with no written work required until the final. Perhaps making matters worse, the first professor's ratings on RateMyProfessor.com all emphasized how demanding he was. Only two people registered for his course, and it was cancelled. It is impossible to know what role, if any, was played by the ratings in this episode. These problems run much deeper than RateMyProfessor.com, and certainly antedate it. But it is instructive to note how the expansion of "informed choice" ends up *constraining* the intellectual choice, if not by outright cancellations as in the example above, then by the absence of any authoritative counterweight to majority preferences, the sort that used to be embodied in mandatory general curricula. This narrows intellectual diversity by cutting the peaks off the curriculum.

Ideally, a teacher's judgment about what is good for you is not colored by what is immediately pleasant for you. But increasingly, what is good for the teacher (professionally) is determined by what is immediately pleasant for the student. The career incentives for professors can be managed to some extent by judicious deans and department chairs, for example, by norming a professor's teaching evaluations against his or her grade distribution and the demands of the course, so that tough grading and a choice of difficult material, even if penalized by students in their evaluations, will not be allowed to threaten a professor's tenure prospects. Absent such a contrarian, clear-eyed defense of excellence by those in charge, *all* the pressures on

a professor tend toward dumbing things down: giving fewer assignments (less work for him), grading generously (less whining and pleading from students), and choosing subjects that are not too remote from the students' experience (a sure path to popularity). Since that prior experience is constituted to a large degree by mass forces, there is a certain uniformity of perspective and taste that begins to assert itself in the curriculum.

The Public Death of the Seminar

While superficially the provision of a service for pay, education appears to be somewhat in tension with the market's animating principle of choice. You are paying for the privilege of submitting yourself to others who know better than you. This idea of submission or surrender would seem to be indispensable to education, yet it is intolerable to our individualistic sense of self-ownership.

In this vein, the criteria offered for assessing professors at RateMyProfessor.com are clearly at odds with the discomforting effects of good pedagogy. "Easiness" speaks for itself; it is the voice of sloth. But even the apparently serious criterion of "clarity" carries a particular view of what education consists in, and it is a rather breezy one. Newspaper articles are usually clear. Certainly clarity is desirable in a lecture, and the absence of it is often nothing but the professor's own confusion or his failure to extricate himself from the tertiary quarrels and jargon of his discipline. Yet the demand for clarity is often the demand for getting to the point, and this presumes that there is a bottom line. Busy executives demand clarity from those who submit reports. Undergraduates are busy too. Transmitting information is surely an important part of education so, by all means, let there be clarity.

But etymologically at least, education is a "leading-out" from oneself, not simply the delivery of information that the student already wants. A good teacher makes a student want the right things, helping him to arrive at true judgments about what is worth taking seriously. As against an easy "clarity," this aspect of teaching is deliberately disorienting—what was previously clear and obvious becomes questionable. In the sciences, common sense is subject to merciless interrogation, and here the teacher has the authority of Science to back him up. In the more interpretive disciplines of the humanities and social sciences, the initial disorientation cuts at passionately held certainties of the present; a teacher can challenge students in this way only if he has a certain independence from them, and only if he is able to speak authoritatively.

That independence is compromised by the public character of RMP, which is a pure function of the technology. Googling a professor brings up his or her reviews, and publicity coupled with the spirit of revenge potentially gives students a very real power over faculty professionally. Prospective employers might as well see what the students are saying, no? (Never mind the social humiliation of not having a chili pepper next to your name.) The natural response by faculty is fear of the students. As in the court of a tyrant, it would make sense if fear begets flattery.

Publicity has subtler effects too. One professor I spoke to feels that RMP violates the intimacy of his seminars—every student is a potential reporter. As against the democratic/IT ideals of openness and transparency, there is something to be said for the closedness of the seminar. The word itself is instructive: It is etymologically connected to "seeds" and the closely related word "seminary," which originally meant a nursery for "sowing, growing, etc. of plants intended for later transplanting." At the University of Chicago, there is a much-beloved teacher famous for his seminars on fundamental topics such as love, in which he nurtures the kind of explorations that are inherently risky. If such a class is to be really fecund, it requires an environment of trust that is incompatible with the sterilizing light of publicity. He permits no casual auditors, no tape-recording. This teacher also conducts his seminars with great formality. Enrollment is by permission. There is no eating. All participants address each other by their last name, with the honorific "Mr." or "Miss." Paradoxically, this formality and closedness fosters a heightened intimacy, and a seriousness that seems to alter students' lives. I believe many students have an inchoate desire for such seriousness; a seldom-articulated sense that there is something important and elevated going on somewhere, and they came to college to try to find it.

The Sophomore Panopticon

Clearly, liberal education cannot proceed like medicine, with bitter remedies simply prescribed by expert authorities against the inclinations of the patient. Successful teaching responds to some felt need on the part of students; learning is at bottom an erotic phenomenon. For the teacher, the task is to awaken that need and seduce students toward those subjects which draw them out of themselves: arts and sciences, classically understood. This requires that students come to see their superior beauty, and come to recognize that liberal education is often more real than the advanced forms of vocational training that win over many students who want to be "practical."

Surely a student reading one of Shakespeare's historical plays looks incomparably more hard-headed, more focused on the concrete, than someone who sits before a textbook on "operations management" filled with abstract jargon. It is the English major who is more likely to be chided that he will never use what he is learning in the real world. But I cannot believe that when his friend the business major gets a job at Citibank, all that operations management training will really be of much use; instead, he will be trained in an afternoon or a week to tend to some very small part of the enterprise. His degree gives him the hope of upward mobility, perhaps. But one suspects this hope of advancement has less to do with the substance of his business studies than with the fact that they accomplish a kind of acculturation—he is initiated into the mentality of instrumentalism.

The issue of mentality is perhaps what all of these questions surrounding IT boil down to, from e-mail and the word processor to online professor reviews. The cognitive effects of various information technologies, no less than their cultural effects, implicitly raise this question: What is the best way to inhabit the world? This is the same question that lies at the heart of education. Yet, if the point of liberal education is to feel the full force of this question *as* a question, and thereby foster open-mindedness, some manifestations of IT seem effectively to make certain choices for us. In letting them do so, we risk collapsing certain possibilities.

RateMyProfessor.com provides a system of surveillance and publicity whereby students can establish norms that faculty must answer to. Exercising this power is especially appealing to students who are more career-oriented, and therefore more prone to resent the power faculty hold over their careers with tough grading. As men and women who have devoted themselves to the life of the mind, faculty are easily viewed as deviants, and the standards they try to uphold dismissed as capricious whim. Viewed in this light, RMP is part of the growing apparatus of surveillance and publicity that brings all deviants into line, absorbing traditionally exempt private spaces of independent thinking into the democratic-commercial fold. This illiberal, homogenizing effect of information technology is perhaps only the flip side of its liberal intention, namely to bring to light and expose all that is hidden and dark.