Being Prepared for Technology Snow Days

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Overview

With increasing use of instructional technology comes the probability that at some point the technology will fail, resulting in lost class time, student frustration, and, perhaps, loss of papers or exams. Faculty consistently cite the possibility of technological failure and the potential to be embarrassed in front of students as one of the most significant barriers to adopting technology.¹ No matter how reliable a given technology, there is always the chance of failure.

What would you do in the following situations?

**Scenario One.** It is end of the semester, and one-quarter of the courses offered at your institution have scheduled final exams using Web-based tools. A day before exams are scheduled the network becomes unstable, making it impossible for most of the students to take exams. The faculty are furious. The students are angry because many have plans to head home for the break.

*How will the institution handle make-up exams and incompletes? What will it do about students set to graduate?*

**Scenario Two.** The latest virus or worm infects your institution. Network administrators are unable to eradicate the virus for more than three days, during which time e-mail and other network functions are either unavailable or unreliable. To compound the problem, the institution offered several online courses. While the content on the course server was not damaged, students who sent e-mails to students outside of the institution infected their computers. The result was not only chaos but bad feelings and loss of class time.

*What happens when a student loses work due to a virus that may have been propagated through the institution? Do you suspend online courses while the system is being cleaned?*

**Scenario Three.** Your institution has made steady progress toward increasing faculty use of technology in instruction. One of the greatest skeptics, the head of the faculty senate, has decided to connect to the Internet during class. On the day of the demonstration, technicians check the classroom connection and declare everything ready. During class, however, the professor cannot get connected. The students begin to shuffle in their seats and talk among themselves, and, after several minutes, some walk out. The professor, humiliated, blames the information technology department for the snafu and vows not only never to use technology in class again but to also convince the entire faculty to abandon its use.

*How do you ensure faculty are confident that the technology, not faculty, will be blamed for technology glitches? How do you ensure that one bad experience doesn’t turn faculty away from technology use?*

**Scenario Four.** Yours is a campus with a sizable commuter and adult learner population. To minimize the schedule conflicts for adult learners and to free up
classroom space on campus, you have encouraged blended learning environments in which part of class is on campus and some of the coursework is done online. On a given evening, all is well on the campus. The next day, however, you find several messages from panicked students. Powerful thunderstorms disrupted electricity in nearby areas, and some students could not complete their assignments in time for the midnight deadline.

*Is it fair to the other students who got their work in on time to give some students extra time to complete their assignment because they were without electricity? For that matter, were they really without electricity?*

For "old" technologies, such as slide or overhead projectors, it was common to keep a spare projector bulb with the machine. Although the technologies used in many classrooms now consist of computers, Internet connections, and videoconferencing units, the insurance of having a back-up plan is just as relevant.

This Research Bulletin addresses the gap between increasing academic reliance on instructional technology and the absence of institutional policies that address either minor or catastrophic technological failure. This Research Bulletin outlines steps that can close the gap by preparing for technology disruption, examining existing policies, and considering new policies. Developing such policies may be even more urgent due to the increased importance of institutional disaster-recovery initiatives, made critical by the September 11 tragedy.

**Highlights of Technology Disruption Preparation**

Technology failures present challenges to information technology (IT) organizations, academic units, and students. Although many policies and procedures exist for more traditional outages, such as a campus closing due to severe weather and the resulting make-up of classes, few institutions have addressed the implications of technology outages, in either technology planning or modifications to academic policies.

The closest analogy to the need for preparation for technology outages is to a "snow day." The metaphor originated in a roundtable discussion at the National Learning Infrastructure Initiative (NLII) meeting in January 2002, when senior administrators from several institutions described situations when their campus educational process was interrupted—but not by technology. One North Carolina institution had six major hurricanes in three years. Another midwestern state system came perilously close to having to shut down all systems because of a labor union dispute. California colleges need to be prepared for earthquakes. Colleges and universities have long-standing emergency policies in place for these situations, but not for technology interruptions.

The technology snow day metaphor establishes a connection between what is known and accepted as a commonplace yet uncontrollable occurrence—campus closing because of severe weather, earthquake, or fire—and the equally uncontrollable occurrence of technology failure. Adapting to technology snow days should not require
The genesis of this research began with the widespread network outages in the fall of 2001. The outages experienced on our campus and at many others provoked the question, “What happens to instruction, assignments due, grades recorded, and/or exams scheduled if technology fails in the classroom or when teaching online?” A literature search, focus groups, and conversations with individual faculty members and administrators at several institutions yielded few answers. A scattering of material was garnered from informal focus groups and e-mail correspondence with faculty. Web and database searches of higher education sources, including journals on educational technology, were largely unproductive, although there was some information in the corporate training literature.

“Networks do go down. Students will panic, unless there are instructions in the syllabus that anticipate forgiveness or outline their alternatives.” Some professors do include their personal classroom policy on late papers and missed assignments, but none reviewed in a random Web search mentioned policies on late submissions due to technological failure. Conversations with faculty members and administrators, either in person or by e-mail, revealed that many institutions have back-up systems to notify people as quickly as possible of outages and of restored service but that those institutions lack formal policies for what to do during the outage.

The type of technology-failure information most commonly found focused on step-by-step ways to approach either broken or malfunctioning equipment. Instructions covered processes for fixing damaged equipment, reconnecting with the network, reestablishing printing connections, backing up work, or handling the vagaries of a learning content management system. One University of Texas system institution began its step-by-step instructions on technology failure with “Remain calm” and ended with “Take students out of the classroom.” Brandeis University posted a Web page entitled “Help! The Network is Down!” Their information therein begins with this: “We don’t mean to belittle your pain, but if you can see this page, the network isn’t down.” Colgate University does post a comprehensive technology failure process, but it concentrates on which constituencies should be notified and when. Materials from corporate training presentations and publications caution presenters to “know their tools”; to “mix media” so they are not dependent upon technology; and to “talk to the techie” beforehand.

Preparation

Institutions and instructors should assume that technology will occasionally fail, but the academic enterprise must have defined processes and policies to ensure orderly and consistent academic continuity through such outages. Plans for instructional technology disruption should draw from, build on, or expand upon existing college and university policies with three intended consequences:
Instituting clear academic procedures for technological disruptions
Outlining preventative steps to reduce technological disruption
Establishing a climate in which the academic community can embrace technology

Engaging in such planning prepares the academic community for technology failure by defining when and where system-wide problems such as network outages, file loss, or storage failures might impact teaching and learning. It also establishes guidelines and norms for dealing with localized technological disruptions in the classroom or with individualized coursework involving online library reserves, the course management system, electronic submission of assignments, or online examinations.

Framework for Discovery

A first step in planning for technology disruptions is a thorough review of existing policies. Is there a “mirror image” of traditional policies that applies to technology-mediated situations? A starting point may be to review existing policies and compare them with current circumstances. For instance, can mandatory attendance requirements for the classroom be applied or enforced for online or hybrid courses? Are they relevant?

Another step is to consider whether there are unique situations involving technology that are not guided by policies or procedures. For example, what is the policy or procedure when a student loses files and productivity due to a virus that came through the institution’s network?

Earlier in this Research Bulletin, several scenarios were outlined in which academic institutions could be exposed to student or faculty criticism in the wake of technological disruptions. Table 1 presents additional scenarios and their potential implications. Using these as a starting point, institutions might want to test their readiness by generating additional scenarios (based on real or hypothetical situations) and determining if policies or procedures to address them are in place.
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<tr>
<th>Scenario</th>
<th>Potential Implications</th>
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<tr>
<td>Students are taking an exam electronically. The network goes down.</td>
<td>Will the faculty member have to design an entirely new exam?</td>
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<td>How soon must students retake the exam?</td>
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<td>A student does not submit a paper electronically at the hour it is due, but it does arrive the day it is due.</td>
<td>Does the time stamp matter if the paper is in the instructor’s inbox when he or she checks?</td>
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<td>Half a term of grades is accidentally erased. The faculty member has no back-up.</td>
<td>Whose responsibility is it to keep electronic back-up of grades and for how long?</td>
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<td>Several courses have assignments due. The network goes down.</td>
<td>Are the students’ papers late? Should they be hand-delivered? Can they be?</td>
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<td>A student cannot access material because of hardware incompatibility.</td>
<td>Should there be a minimum standard for computing equipment?</td>
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<td>Even though the university’s distance courses are ADA compliant, a visually-impaired student at a remote location cannot access the course consistently.</td>
<td>Does the institution have to make other arrangements for the student to complete the course?</td>
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<td>An untenured professor often uses technology in the classroom. The professor is able to use the equipment, but it often stops working when the class meets. The students indicate their displeasure through course evaluations.</td>
<td>Does the institution have a way to separate pedagogy from technology in course evaluations?</td>
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<td>As part of the contract with a course management system provider, courses are stored so that faculty can use them again each time they teach that course. Because of a technical problem, several courses are wiped out entirely.</td>
<td>Who is responsible for recreating these courses electronically? What will faculty do in the meantime?</td>
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By using scenarios, institutions can begin to prepare for technological failures. There are also a number of steps that institutions can take to ensure they are not surprised by a technology snow day. One of these steps involves adapting or expanding policies to cover technical problems.
Steps For Avoiding Technology Snow Days

Rewriting policies is not enough on its own to close the gap. There are additional steps necessary to determine (a) where technical vulnerabilities exist and whether this exposure can be minimized, and (b) what type of training and development might minimize risks.

Build Policy Based on Team Input

Traditionally, academic, faculty, and student policies are written by the individuals primarily responsible for their implementation. When considering technology failures that cut across administrative and academic boundaries, planning should involve faculty, administrators, student leaders, and information technology specialists so that everyone understands the consequences of systemic and localized failure. Both the academic and technology representatives need to identify individuals who can be called at a moment’s notice and who are empowered to make immediate decisions.

Communication Channels

Another important step is to establish precise communication channels and processes. In the same way that institutions notify television and radio stations of campus closures, individuals must be authorized to set the policy in motion in the event of technology outages. If the network goes down, there should be multiple channels of communication to the residential and online communities (such as broadcast telephone messaging). In the event of a catastrophic technology outage, the hardest group to communicate with will be those at a distance from campus.

Standardization

One linchpin to advanced technological preparation is standardization for audio-visual equipment, computers, and software. If each classroom contains the same type of projector, screen, VCR, and controls, faculty can more easily learn how to operate the equipment, and technicians and help desk specialists can respond more quickly to questions and problems. To ensure that all students have the capability to access material over the network or World Wide Web, more and more institutions require that student computers have a minimum configuration (standardization of function and features, not a brand name). Choice of a standard software (for example, Blackboard or WebCT) also increases efficiency in faculty development programs and in solving technical problems.

Redundancy and Back-Up Systems

Another preventative measure that helps minimize technology snow days is to have redundant equipment and to require back-up of course material and grades. While redundancy may be expensive, it assures a constant fall-back option. Redundant systems can also allow for scheduled maintenance without disruption to service. Many institutions are preparing business-continuity/disaster-recovery plans. These should include online courses, online materials, e-books, and digital archives. The information
technology department and academic administrators can review and determine the amount of redundancy that is needed or affordable.

**Alternative Plans**

Faculty should consider policies, procedures, and alternate strategies for technology failures. Without dictating how a faculty member conducts class, guidelines can be suggested, such as

- Outlining what happens if a student is timed out of an online quiz (the connection is lost, the server goes down, power goes out)
- Setting up alternatives for sending and receiving of assignments (fax, campus drop box)
- Establishing a communication mechanism to let students know when a technological problem occurs and options for dealing with it
- Having a back-up of all course material
- Requiring students to keep all grade-related material in hard copy or on a disk

Faculty should be encouraged to participate in professional development to increase their pedagogical repertoire, providing more alternatives for snow day situations. New technology may even provide alternatives (wireless, hand-held computers).

**What It Means to Higher Education**

Higher education is just beginning to see technology as a central part of the institution’s infrastructure. By acknowledging the potential for technology to fail, students, faculty, and administrators can acknowledge its importance—both in and out of the classroom. Institutions can safeguard themselves by recognizing the interdependence between academic functions and information technology. This interrelationship carries implications for students, services, and the budget.

**Students.** Institutions should help students set appropriate expectations for information technology and understand the relevant policies. This may involve material posted on the institution’s Web site, student orientation programs, or student handbooks. Discussions might be useful, such as those that focus on elaborating and underscoring student responsibilities (for example, meeting assignment deadlines regardless of technological disruptions), on wise network use (for example, not downloading large files), or on understanding that technological failure is inevitable and not the fault of a professor.

**Services.** Faculty fear technology failure because of potential embarrassment and the specter of poor evaluations. They also question whether they should be responsible for infrastructure issues. For example, a query to a listserv elicited the following representative response:
I’ve despaired of being able to accomplish anything significant when [the management system] is down. Faculty should have back-up plan? I think the situation of a faculty member resembles that of a surgeon. Hospital administrators provide back-up lights to prevent a power outage from causing surgical failure. They don’t expect surgeons to bring their own flashlight. At some point, technology … becomes mission-critical, and the IT group needs to shoulder the burden of providing high availability …. Sure, I can hold an impromptu discussion or something when technology fails. But students are generally aware that a class is operating in fallback mode. They tend to believe—rightly for the most part—that any substitute activity is intended merely to fill airtime and therefore not worthy of their full attention and participation.

Consistent access to Information technology relies on services from many units—physical plant for replacement and repair of audio-visual equipment, help desk for advice, contracts for vendor services, and so on. For those services that relate to IT, appropriate expectations should be established and support provided.

**Budget.** Planning for technology failure carries budget implications. Equipment must be upgraded and serviced regularly to function properly. Redundant equipment is an additional expense. Personnel costs for training and support must also be considered.

**Summary**

Not long ago there was one standard way of getting an assignment to the instructor—handing it in. Communication was, for the most part, in person or by telephone. Classroom presentations relied heavily on chalk. Today there are multiple ways to submit an assignment, a myriad of ways to demonstrate a concept. These possibilities allow greater freedom of choice for faculty and for students. With those choices come greater risks. As higher education increasingly relies on technology for instruction, planning how to let students and faculty succeed even when technology fails is an important step in institutional quality.

**Key Questions to Ask**

- Do we have policies that apply to situations of technology failure? How dependent is our overall instructional delivery on technology? How dependent are we on technology for course administration (for example, electronic grades)?
- Are there legal risks if we do not have policies in place related to technology failure?
- Do any current policies conflict with the electronic delivery of education?
- Is there a standard policy in place for late online assignments, make-up exams, and quizzes?
- Is there a single point of contact when the network (or servers) go down? Is there a standardized form of communication to the community if there is a disruption?
- Are there redundant systems?

**Where to Learn More**

- Article on how to prepare for technology failure:
  <http://globeandmail.workopolis.com/servlet/Content/rprinter/20020703/cpsa-techfail>

**Endnotes**


2. A grateful thank you to roundtable organizers and participants: Diana Oblinger, ECAR Senior Fellow; Joel Hartman, Vice Provost, Information Technologies and Resources, University of Central Florida; Susan Metros, Deputy CIO and Professor, The Ohio State University; Linda Baer, Senior Vice Chancellor for Academic and Student Affairs, University of Minnesota; John Cavanaugh, Provost and Vice Chancellor for Academic Affairs, University of North Carolina at Wilmington; and Paul Hagner, Senior Advisor for Technology Planning and Assessment, University of Hartford.


4. The Brandeis Web site is no longer available.


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