Hacking Spaces: Place as Interface

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Abstract

In this article, we analyze the complex rationales—both transparent to us and, at times, made visible—underneath the instructional spaces in which we work and teach. To do so, we first situate space analysis in the larger, national conversations about instructional spaces and then through the work of computers and writing scholars. We conclude with an analysis of instructional spaces at our institution. These are spaces specific to our locale, but spaces we think are quite common at most institutions of higher education. Perhaps more importantly, we situate this space analysis on issues these spaces pose—issues of restricted movement, impaired ability to collaborate, sensory disruption, limited leadership ability, and functional/material constraints. We attempt to return to the roots of hacking and to situate hacking as a particular tool for negotiating and, at times, disrupting the assumptions built under, within, and across instructional spaces.

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1. Introduction

... we must also develop a more flexible, forward-looking understanding of the relationships that occur at the nexus of technology, pedagogy, learning, and physical space...

We must also look anew at the design of learning spaces... [that] provide... communication, collaboration, and computing functionalities; are personalizable, user sensitive, and mobile; and are matched by a new generation of learners that are ‘digital natives.’” (EDUCAUSE Learning Initiative, 2007)

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define: interface

a method or piece of equipment for interconnecting units or systems that may not be directly compatible
the common boundary between two things
a physical or functional interaction between two systems communicate
the boundary at which two systems communicate
a balancing act between graphics, information, and interaction (Google)

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In an upper-level digital rhetoric course Dânielle teaches, a unit is devoted to analyzing physical and virtual spaces. Readings that correspond with the unit range from media-rich experience spaces (like Don’t Click It, a movement-based site where users explore by mouse motion rather than by clicking) to more field-specific analyses of spaces, such as Cynthia L. Selfe and Richard Selfe’s (1994) “The Politics of the Interface: Power and its Exercise in Electronic Contact Zones” and Anne Frances Wysocki and Julia I. Jasken’s (2004) “What Should Be an Unforgettable Face…”

This digital rhetoric course attracts both undergraduate and graduate students. In the context of physical space discussions, Dânielle asks students to:

1. Imagine a technology-rich space for learning, collaborating, writing, creating, and designing;
2. Create a list of five goals for the activities that will take place in the space and five tasks they’d want people to be able to do or accomplish in this space;
3. Map the space out, showing its elements and arrangement, either by drawing on transparency sheets or giant Post-It sheets, or using applications like Microsoft PowerPoint or Adobe Photoshop; and
4. Contextualize the space—articulate the institutional, financial, legal, technical, and other concerns or issues related to designing and using a space such as that which they have designed.

The spaces students craft are fantastic, engaging, robust—and relatively reasonable. Students generally want flexible spaces, where tables and chairs can easily be rearranged based on activity. Students want display screens, so work can easily be shown and shared among small groups. Students want laptop-friendly, wireless spaces, where they can easily move around. Students want food, drink, and natural light. Students are, however, also realists; they immediately recognize the financial reasons why our spaces don’t look like this. It’s much cheaper, for instance, to install desks in rows with little space between rows or even between computers. It’s efficient to pack as many computers as possible in a row-based room. It’s dangerous to allow students to eat and drink at university-owned machines. It’s appropriate, based on what they know about how school “happens,” to have the instructor station as the focus in the room. What students don’t often recognize are the historical, pedagogical, and philosophical reasons why many of our computer labs look the way they do.

It should not be particularly surprising to any readers of this journal that computer labs situated in rows replicate a traditional, lecture-style mode of teaching, where the teacher is the authority in the room and lectures from the front of the room. The space is designed so students face the teacher, can only see the backs of each other’s heads, and cannot easily collaborate. These spaces facilitate individual, isolated learning. The notion of networked computers as spaces of isolation has exploded in the past 10 years or so with the spread of social networking and messaging technologies, but these physical spaces typically predate the Web and were designed and built with minimal network activity imagined. And thus this article serves as a call for computers and composition researchers invested in space, space planning, and space design to lead (and continue to lead) initiatives at their campuses. We suspect at this particular moment in time that many campuses are tackling what our campus is addressing—fairly large-scale space renovations in the face of computer labs now 10 or 15 years old. This is a particularly powerful moment to change the institutional space and the intellectual space in which technology-rich writing instruction happens. That said, however, powerful moments are just one way to change the spaces in which we research and teach. Given that large-scale changes tend to unfold across committees, investments, time, and other elements, small potent gestures (an expression Cynthia Selfe first put into circulation) are what we address here in this article. That is, we describe small yet also powerful ways in which we can push back against the spaces in which we currently work.

In this article, we thus dig a bit deeper into the complex rationales—both transparent to us and, at times, made visible—that explain the spaces in which we work and teach. We situate our work within a brief discussion of larger, national conversations about instructional spaces and of the work of computers and writing scholars, work that spans approximately 25 years. We then adopt hacking as a useful activity for reworking the spaces in which we teach, which are often less than ideal and often do not complement our pedagogical approaches. We conclude with an analysis of a range of spaces from our institution (spaces specific to our locale, but which we think are quite common at most institutions of higher education) and with a set of tools for hacking these spaces—that is, for accessing their “code” and rescripting it.
2. Some context: Space

The general pattern of school organization [results in] a kind of institution sharply marked off from any other form of social organization. (Dewey, 1938, p. 18)

I did my ethnography about the main library where I was concerned with space and use of space in a social context... One of my sections in the paper was specifically about the tyranny of table and chairs and 90 degree angles... on the way that such structures form the body, not the social body in the library. (Rachael Hodder, undergraduate student researcher, personal communication)

2.1. Technology-rich learning spaces: The national and historical landscape

The division of school and other social organizations that John Dewey described 70 years ago manifests itself most obviously in the way our spaces are constructed. Although we interact, socialize, and otherwise live in very flexible and various physical spaces, our classrooms often remain inflexible spaces, typically based in agrarian and industrial revolution era designs (Scott-Webber, 2004; Whisnant, 1979). These designs direct attention toward one individual leading the learning process, which, among other effects, discourages student collaboration. These spaces are also often physically uncomfortable, with little space to place or use items needed for learning in a 21st-century world. We find this type of classroom design in most buildings on most university campuses around the world; perhaps worse, we find faculty and students have become so accustomed to meeting in this type of space that most have taken these conditions as a fact of college life (Chism & Bickford, 2002).

Classrooms are complex social environments where teachers and students engage in a variety of activities as they work to accomplish tasks with academic, social, and personal consequences (Shuell, 1996). Among the complexities of classrooms lie a set of distinct properties including multidimensionality, simultaneity, immediacy, unpredictability, publicness, and institutional history, and these properties affect and are affected by the physical layout of the learning environment. Yet, as Banning and Canard (1986) pointed out, among the many considerations we give to fostering student development, the “use of the physical environment is perhaps the least understood and the most neglected” (p. 1).

The modern classroom—to meet the demands of mass education—was developed using the already successful post-industrial-revolution model of factory production (Bransford, Brown, & Cocking, 1999). It was assumed that students could be educated in an assembly-line fashion where the instructor held all of the knowledge and transmitted this knowledge to students before moving them along to the next grade level (Callahan, 1962). Changes in our understanding of student learning and the needs of our 21st-century student population are now prompting a further refinement of learning space design. National conversations across technology-invested fields (e.g., among composition and rhetoric scholars, among library scientists, within groups like EDUCAUSE) about the physical spaces in which we teach and learn are becoming more and more common. Conversations about learning spaces have been featured in trade journals and professional magazines, books, professional conferences, and academic journals. The theme across these conversations is the goal of changing learning spaces from their static configurations—which typically promote a particular and limited type of interaction—to flexible, technology-friendly spaces that support a range of interaction types and encourage collaboration.

Recently, institutional values about what makes for successful teaching and learning has become a core element in designing learning spaces. Space design at many institutions is no longer a separate process handled by facilities management (often in isolation from the stakeholders and users of space). More and more scholars, teachers, and administrators have accepted that learning spaces should consider how people learn, what tools and technologies are used for teaching and learning, and who is learning (i.e., the actual demographics and characteristics of the students) (Brown, 2005; Johnson & Lomas, 2005; November, 2007). Space is being situated in tandem with best practices in teaching, often resulting in the promotion of learner-centered, knowledge-centered, and community-centered learning (Bransford et al., 1999). For instance, North Carolina State University’s collaboration stations allow students to come together around common displays with ergonomic furniture to work collaboratively on computing and other course work. MIT’s Steam Café is an excellent example of a space designed to promote community and informal learning. Input was solicited throughout the development process, with plans and designs revised with and through feedback phases. On the café’s web site, blueprints, plans, and processes are available, and the Café itself is described as a
physical and virtual “spatial experiment” in “open source problem solving” in creating “infrastructures that encourage future development by participant involvement” (Francisco, 2006, p. 27.1). In the space itself, chalkboards and SMART boards are accessible from the café tables, so students can eat, drink, work, and easily collaborate. Spaces like this are flexible, with common technological interfaces, shared resources, and, in many cases, seamless technology integration; they promote both formal and informal learning and adopt a commons-based approach to knowledge-making (Valenti, 2005; Waters, 2008).

Despite much discussion about learning spaces, despite widespread acceptance of learning commons models, and despite the examples listed above, it is only recently that we have begun to see actual changes in space design, leaving many of us to make the best of teaching in more traditional classroom spaces. This is often the result of the pace at which institutional change happens, when redesign initiatives (especially those involving complex changes in electrical and network structures, wall placement, and overall room arrangement) can take years to develop and implement. We’ll return to ways in which we can hack slow-moving institutional structures after we review work on space issues in computers and writing.

2.2. Within computers and writing

Many labs have been set up by the folks at the computer center, who typically see the labs as places for students to drop by and do work for classes. And though it always turns out that the major use of campus microlabs is word processing, this fact is only admitted reluctantly and has little to do with planning. Usually there is no explicit consideration of how the space will be used—the question is, “How many computers will fit in this room?” (Bernhardt, 1989, p. 93)

As the discussion above attests, our needs are not terribly complex. We want to talk. We want to collaborate. We want to eat. As the discussion above also attests, however, space is phenomenally complex and bears traces of particular historical approaches to learning, and institutions are generally slow to change. In the review that follows, we migrate from the larger discussion about learning spaces and their evolutions and move toward a more focused review of how computers and writing scholars have addressed issues of space. This review layers in an additional set of complexities for space-design advocates to consider in hacking institutional spaces.

Computers and writing scholars have focused on issues of space as related to access; that is, to physical/material access to machines and tools and, second, to training and communities of support to actually use machines and tools. For instance, Selfe (1987, 1989) documented the perilous and difficult paths toward acquiring funding and support for both creating and sustaining computer-based spaces for writing instruction. These paths are often complex and traverse access to multiple policies, procedures, protocols, departments, and budgets and typically include stakeholders from many different places and vantage points within the institutions being discussed (see Devoss, Cushman, & Grabbill, 2005, for an extended discussion). Others have discussed space-and-access in secondary school settings (Devoss et al., 2002; Graves & Haller, 1994; LeBlanc, 1994). Scholars have also considered the ways in which access manifests at intersections of gender, class, race, and community (e.g., Brady Aschauer, 1999; Blair & Takayoshi, 1999; Faigley, 1997; Fitzsimmons-Hunter & Moran, 1998; Grabbill, 1998; Grabbill, 2003a,b; Moran, 1999; Powell, 2007; Regan & Zuern, 2000; Selfe, 1999).

Along with space-as-access dynamics, scholars in computers and writing have attended to issues of software as “space.” Perhaps the most infamous analysis of a particular virtual writing space is Marcia Peoples Halio’s (1990), in which she argued that the Macintosh was too playful and too easy to support mature writing. In that same year, a group of scholars responded to Halio’s claims, pointing out the significant flaws in her research methods but noting that “for all the flaws in her article, Halio has raised serious questions about the effects of hardware and software design upon those who write with computers, and we must certainly investigate those effects more fully” (Slatin et al., 1990, p. 78). Continuing this work are scholars including Gail E. Hawisher (1986, 1988), whose early work focused on research in word-processing software, and also Hawisher and Selfe (1991), Patricia Sullivan (1991), Janis Forman (1991), and Donald Ross (1991).

From this early work emerged some of the pieces considered landmark in our field; for instance, Selfe and Selfe’s (1994) interrogation of the “borders” built into classrooms, systems—and, specifically, software—and the power differentials constructed and maintained by these borders. Wysocki (2001) and Wysocki and Jasken (2004) performed the deepest interface interrogations since the 1994 Selfe and Selfe piece, arguing that interfaces are rhetorical and
reminding us of the importance of understanding interfaces as such. Specifically, they asked us to question the ways in which interfaces encourage us to see and also ask us to forget to see, or to overlook.

A third point of space-based attention has been directed at virtual space. Electronic spaces like email, bulletin board systems, and MOOs/MUDs have captured the research attention of a range of scholars, including Marilyn Cooper and Cynthia L. Selfe (1990), Joyce Kinkead (1987), Charles Moran and Gail E. Hawisher (1998), Albert Rouzie (2001), Raul Sanchez (1998), Michael Spooner and Kathleen Yancey (1996), and Diane Thompson (1990). Scholars have recently analyzed computer-mediated communication types and what “happens” in virtual and networked coursespaces (e.g., Blakelock & Smith, 2006; Blythe, 2003; Yancey, 2003).

Perhaps the most important—for this article—theme emerging from computers and writing scholarship on space has to do with the physical layout of the spaces in which we teach. Scholars who have published on possibilities and complications related to teaching in computer-mediated settings include Stephen Bernhardt (1989); Bruce Britton and Shawn Glynn (1989); John Dinan, Rebecca Gagnon, & Jennifer Taylor (1986); Sibylle Gruber (1995); Christina Haas (1996); Roxanne Kent-Drury (1998); Charles Moran (1998); Mike Palmquist (1993); Mike Palmquist, Kate Kiefer, James Hartvigsen, & Barbara Godlew (1998); and Cynthia Selfe (1989). All of these scholars have addressed the ways in which space shapes practices and offer a range of issues and affordances to consider. For instance, Bernhardt outlined the major issues related to computer-based spaces for writing instruction, including issues of control (that is, who controls the space—a centralized unit or a writing program?).

In 1987, Selfe described the development and sustenance of a humanities computing lab, narrating the theoretical, pedagogical, financial, and other considerations weighed in the launching and expansion of a computer lab. She described the process of “refining” a new vision, which was not an easy task; we had to fight a continuing battle against our own conceptual inertia, to forget what computer labs should look like and think instead about what characterized a comfortable, relaxed writing environment.

Working from this perspective, we focused on writers rather than on machines. (p. 55)

Kent-Drury (1998) offered a dystopic perspective of such spaces and the alienation a writing teacher faces when computer screens face walls, odd clusters or pods hide student faces, and students negotiate continual computer-based distractions. Kent-Drury continued by providing a view of the networked classroom that situates it across seemingly fragmented spaces, locations, policies, disciplines, and more.

Robert Johnson (1998) and Jim Porter and Dânielle Nicole DeVoss (2005) have articulated the most prevalent theories of instructional space design (these theories span spaces and also describe systems and networks as well): First, the system-centered approach, where the design determines activity and users are forced to adapt. Second, the user-friendly approach, where the design determines activity, but some effort is made to help users acclimate or adapt, often late in the design process or in very minimal ways. And, finally, the user-centered approach, where activity is an act of negotiation and affordances are crafted as part of a negotiation between designers and users across the design process. Unfortunately, as Porter has noted, the most common approach is the system-centered approach.

2.3. Summarizing spaces

Wysocki and Jasken (2004), in their analysis of how interfaces shape and obscure, argued that “the design of software is thus also the design of users” (p. 35). We would like to adopt and adapt this eloquent point, and argue that the design of spaces is thus also the design of users—and, importantly, also the design of the uses of particular spaces. Admittedly, the review above is partial and necessarily messy. We did not, for instance, address the space of faculty in departments, specifically faculty labeled the “computer person.” We did not, for instance, address the space for computers in more traditionally minded departments. We did not, for instance, address the space of faculty work in departments, and the ways in which scholarship produced for and published in digital spaces affects how work is valued. The list of “did nots” could continue endlessly, for, as we would argue, space frames all that we do—physically and digitally. What we have done, we hope, is call attention to some of the key complexities of space, and to the need for us to continually interrogate issues of space, especially the spaces—physical or virtual—that we occupy as teachers, researchers, and scholars.

Physical space is perhaps one of the most important, yet often overlooked, issues of interface that we negotiate as writers, researchers, and teachers. If we understand space as the boundary between two “bodies,” we can situate the spaces in which we teach as multiply bounded—by institutional regulations and organizational places, historical
approaches to layout and design, policy issues related to use, and much, much more. Unfortunately, because spaces are long-standing artifacts, many of the space-related challenges we faced as teachers 20 years ago are the same challenges we face today.\footnote{At our institution, for instance, we are encouraged to think in a “10-year trajectory” for space planning. This 10-year trajectory relates to moving departmental offices or computer labs and reconfiguring floors of buildings. A much longer trajectory is recommended for massive space changes, such as moving entire departments; consolidating physically separate units in one space; or launching the development of multiple, linked spaces at once (e.g., building three new computer labs at once). The computer lab developed by, built for, and devoted to our undergraduate professional writing major required 3 years of development, administrative wrangling, and logistical planning before it was approved for development.} Although technologies are dynamic and our pedagogies are flexible, the institutional spaces within which we teach are often much more rigid.

3. Hacking the writing classroom: Resituating hacking as a tool for space use

A particular tool we’ve found effective in responding to the constraints we’ve described above is hacking. In deploying hacking as a tool, we attempt to resituate hacking and return to its roots. Often, hacking is seen as unauthorized and illicit network activity—attempting to crack a system to erode security mechanisms or to cause harm, such as planting a virus or mining files containing protected or private data. We want to recover notions of hacking as positive: specifically, we want to situate hacking as learning about computers, software, code, and networks by hands-on study and analysis. We want to situate hacking in response to information and expertise hoarding; we want to situate hacking as a community-oriented act engaged to better our relationships to and work with computers and networks and, specifically here, instructional spaces.

Although he was writing about expert systems technology and the military, Manuel DeLanda (2002) appropriately noted that when expertise is hoarded, “technology may be seen as a way of centralizing control” (p. 146). De Landa described the work of artificial intelligence researchers Marvin Minsky and John MacCarthy and their approach of inviting hackers into a system to push at it and test it. This sort of “white hat” hacking\footnote{White hat hacking is a term used to describe ethical hacking; white hat hackers are often consulted with or contracted by companies to test computer and network security. In contrast, black hat hackers are computer specialists who engage in malicious cracking and hacking, to plant viruses and worms or to mine sensitive data.} is computer-based open-source work at its earliest—a community of coders and programmers developing work and sharing it in computer-based toolboxes. Lawrence Lessig (1999) also chronicled the hacker mantra: “he [sic] was not to steal; he was not to do damage; he was to explore, and if he found a hole in a system’s security, he was to leave a card indicating the problem” (p. 194). Katie Hafner and Mathew Lyon (1996), in describing the origins of the Internet, called this good hacking—“a creative or inspired bit of programming,” a way of identifying problems, patching holes, and making systems better (p. 190).

Gisle Hannemyr (1999) described the ways in which Taylorism influenced workspaces and how that influence shaped the work of computer programmers in the 1960s. Because the Taylor methods sought to “increase standardization and specialization of work,” programmers found themselves in increasingly regimented workspaces, with narrow task definitions, framed by programming standards (n.p.). Hannemyr described the division of labor that emerged in computer programming—systems analysts managing programmers, coders, testers, maintainers, computer console operators, computer room technicians, etc. (and this list is not innocent—the hierarchy this list implies was real and enforced). Due to this hierarchy and delegation of labor, the social aspects of programming withered; hacking, as it initially emerged, started to die. Hannemyr noted that the results were “dequalification of computer work, the destruction of programming as a craft, and the disintegration of working communities of programmers—all in order to give management more control over computer workers.”

If we take this Taylorist model and slide it to instructional spaces, we are able to see similar hierarchies. At most institutions, for instance, IT units and network managers oversee networks and the use of networks. A rung down on the work ladder might be staff members who, for instance, create images for networked machines, then those who run and maintain the images; then there are those who service and maintain the machines themselves. On this particular ladder, we would argue that instructors are typically situated quite low, perhaps even dangling off the last rung along with student-users. In making this comparison, we do not want to create an all-encompassing view of IT staff as inherently evil; we’re talking here more about tasks and roles than people. What we do want to do is call attention, however, to the hierarchy of technical control that does exist. Too often, this hierarchy is invisible, especially to those most
affected by it, and the hierarchy is both enacted and embedded through policies, protocols, and procedures—the larger infrastructures in which we live, work, and teach.

In response to hierarchies and systems of control and constraint, we turn to Andrew Ross (2001), who identified a spectrum of hacker activities, the last being hacking as “guerilla know-how” anchored to resistance and oppositional knowledge. The activity of guerilla know-how is best anchored to hacktivism—the art and practice of hacking in opposition to a damaging or restrictive ideological or political power. In “What is Hacktivism?”, meta0m (2003) also drew upon historical notions of hacking and offered the following definition: a rhizomatic “fusion of hacking and activism; politics and technology” (n.p.). The New Hacker’s Dictionary defines a hacker as a person who willfully and creatively overcomes or circumvents limitations (“Hacker,” n.d.). In the section that follows, we want to offer some productive possibilities for teachers to hack instructional spaces—to willfully and creatively overcome the limitations we’ve described above.

What we’re not necessarily hitting head-on here are the complex institutional, political, and economic moves required to significantly change space in a sustained way. We’re not talking about entirely redesigning spaces or operating within the 5- to 10-year trajectories of most massive space-change efforts. What we’re talking about is hacking the spaces in which we work in a short-term time frame. We’re talking about an instructor who has been centrally scheduled into a computer lab and who checks out that lab a week before classes start to find that it’s workable but not pedagogically ideal. Hacking, for us, is a useful term for understanding the ways in which this instructor can make that space useful and more pedagogically appropriate in the context of that class and that semester. Admittedly, as we introduce it here, our notion of hacking space is not necessarily intended to further the discussions of those of us who wield significant institutional and space-related power or those of us who engage in dialogue with others in the actual design of technology-rich instructional spaces, though certainly they could benefit, we think, from such a discussion. After all, no design of space exists without context of use; thinking about how spaces are supported (or not) is always, we think, useful. Our application of hacking may prove (beyond this particular article and the context in which we are writing) to be a powerful tool for designing future classrooms.

We feel that hacktivism is most powerful as the tool of instructors who inherit the design of classroom environments from someone else and who are often absent from the design decisions produced through space-scheduling and space-use conversations. The productive tool we want to offer here, in this article, is driven by our reclaimed notion of hacking and is an analytical framework that provides direction for taking apart oppressive technology-rich physical spaces and reassembling them into more pedagogically appropriate, productive learning spaces. In offering this framework and analyzing some example spaces, we hope to, literally, physically ground discussions of how seemingly mundane physical infrastructures in which we live, work, and teach.

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This article was inspired, in part, by the room scheduling practices at our institution. Course scheduling occurs 14 months prior to courses starting (so, for instance, we scheduled fall 2009 courses in summer 2008). Instructor placement into courses happens incrementally, typically with tenure-system faculty scheduled first and graduate teaching assistants assigned to courses last. Teaching spaces are generally not considered during the teaching assignment process; thus many of us find ourselves assigned to a course and requesting a technology-rich space mere weeks before classes start. Our institution of 47,000 students has just over 300 public classrooms available and about 40 computer labs for teaching. Our institution has more than 10 university-level committees engaged in space planning and facilities management. At the same time as some instructors are scrambling to make best use of a particular space they perhaps did not select for themselves, others of us are serving on university- and college-level committees navigating 10-year trajectories for space design. We attend here more to the former group and to practices for best making use of space—for hacking space.

4. Toward hacking space

We turn now toward an analysis of the places in which we teach—computer labs on our campus. We analyze a set of places across movement, collaboration, sensory, leadership, and functional/material issues. We use these categories
not just to organize issues of place but also to develop an analytical framework to guide our analysis of space and enhance our hacktivist agency in light of space-related issues.

4.1. Places and spaces

The following descriptions and understandings of networked labs come from a grounded, real-world understanding of and working in a particular space (that is, publicly scheduled, networked computer labs where a number of classes in different disciplines are held; “publicly” refers to the fact that the labs can be used by all departments and units—they are not “owned” or controlled by any one unit). In this sense, the analytical framework we describe below to understand and adapt to these places is localized in an infrastructural space and is limited by that understanding. In another sense, we understand the issues we describe below to be common problems across a number of places and spaces including our own campus but also including many networked writing labs in North America and elsewhere.

In this sense, the development of our analytical framework—and part of the strength of frameworks generally—is their inherent malleability in dealing with shifting and uncertain situational modifiers. In other words, teachers in other spaces may find that they have one or maybe none of the topographical problems we describe, or they might have problems that would develop entirely new categories of problems that might still be addressable by our recommendations. We use specific examples about our networked places with the intent to, literally, ground our discussions in actual physical place to help elaborate our analytical framework. We feel it might be helpful to think of our examples as serving a metaphorical function, as a relational idea to other experiences, rather than a synecdochic function, where the classrooms stand in for all classrooms.

4.2. A five-fold analytical framework

The categories we provided above in thinking through the ways in which computers and writing scholars have addressed issues of space is one taxonomy (i.e., space and access, software as space, virtual space, and physical space). Here we propose another taxonomy, one that allows for a more fine-grained analysis of specific spaces (rather than the broad trends we identified above across a review of scholarship): we identify problems that interfere with writing classroom pedagogy to reside with issues that interfere along the lines of motion, collaboration, senses, leadership, and function. Problems of motion or movement are problems that physically shape space and prevent people from moving in and around the classroom. These are tied to problems of collaboration, which are problems that inhibit idea generation, discussion, and reflection between members of a class. We understand issues related to the senses as problems that interfere with the physical senses or that prohibit sensory acuity within a space. Problems involving leadership are issues that interfere with the instructor, student, or student group ability to guide the class through activities or discussions. Finally, issues related to function often have to do with materiality and problems that involve technological infrastructural or functional technical literacy. Although we have fragmented our analysis below using the five categories, it becomes immediately apparent that most of the factors affect one another; that is, restricted movement affects collaboration; sensory issues impact leadership; functional issues might restrict movement; etc.

4.2.1. Motion

Often, computer labs are constructed in rows, the most space-saving configuration; that is, you can fit more computers into a particular room if the computers are arranged in rows. Fig. 1 illustrates at least two motion-restrictive elements typical of such spaces. First, there is only one entrance per row; students at stations 5, 9, 13, 17, 21, 25, and 29 sit next to a wall. Second, in this particular lab, there is approximately 2 feet of space separating one student station from the next, with just over 3 feet of space between one student station and the station behind it.

The restriction of movement makes collaboration physically difficult in this space. Students cannot congregate around each other except in rows. Students in one row cannot turn their chairs around to work with students in the row behind them, because the bulky computer monitors block students from one another. Students cannot easily move their chairs together to work because of the limited amount of space between rows. These problems are compounded by the physical place being “locked down” in a very real sense: Wires, cables, computers, and monitors running the length of these rows are bolted to each other to prevent theft. Because of the bulky security cords fixed to the monitors, for instance, students cannot turn their monitors so the student sitting next to them can easily see their screens.
4.2.2. Collaboration

Student collaboration is a key component of our pedagogy, so we are keenly aware when space interferes with such collaboration. Fig. 2 presents a lab space designed in cubicles; although not readily apparent in this floorplan, each machine faces a fairly high barrier wall. Students sit with their backs to one another in each cluster. Although this is a teaching lab, with an instructor station, the student computer clusters have walls high enough to restrict sight. If standing, the instructor can see students in the clusters, but if the instructor is sitting, students cannot see the instructor or the entire projection screen (labeled PS in the figure). Additionally, and perhaps unintentionally, small groups of students are limited to groups of four based on this design, so although some collaboration among students is facilitated by this space, the space itself limits the number of students who can collaborate. The clusters are not large enough to accommodate more than four chairs/students, and clusters are physically restricted from interacting with one another.

In Fig. 3, Xs mark poles in the room that span from floor to ceiling. Students sitting behind such ceiling supports often find themselves having to crane their necks around not only the supports but also the monitors in front of them as well as the heads of other students who have the same problem. These sight line issues affect the instructor’s, a
Fig. 2. Cubicle-like layout restricts ability to collaborate.

Fig. 3. Large poles block sightlines, limiting sensory input.

student’s, or a small group of students’ ability to lead the class by interfering with the sensory input of vision. In Fig. 4, Xs indicate isolated machines in a long, narrow room where students working at those machines are not only physically separated from the instructor (in this particular room, students at the orphaned machines sit with their backs to the instructor station) but from one another.

Restricted vision is not the only sensory problem that may develop in such a classroom. The Xs in Fig. 5 indicate air conditioning units, which are often incredibly loud. Even in Michigan’s winter, but especially during the spring and summer, these rooms can become quite warm. Working in a stifling room is a physical distraction; another distraction, however, is the actual noise produced by the air conditioning units. At our institution, many of the networked classrooms do not have windows; often, if they have windows, the windows have been permanently sealed to protect the computers, cables, and wires.

3 We understand that not all students are visually sighted, and it is not our intent to state that those with visual or audio impairments are disadvantaged, inherently, in these learning environments. Our point is that compensating behavior can and should be made for issues like the ones we are discussing for students who have sensory impairments regardless of whether these impairments come from classroom topography or from physical disability.
Fig. 4. Orphaned machines physically separate students from one another, limiting collaboration.

The Xs in Fig. 6 indicate a collapsible wall; the wall is moveable and can be opened or shut depending on whether a class is large enough to demand use of the entire space or small enough to require just half of the space. Because the wall is moveable, sound easily leaks from one room to the next. Additionally, the printer that services the room sits in the small space indicated at the bottom of the figure. If a student leaves the room to retrieve a print-out, sound can easily bleed out from one room to the next from the printer room.

4.2.3. Issues of function

Finally, technology does not always work. Mouses break, monitors go bad, and networked printers run out of paper, all of which contribute to making certain planned in-class activities impossible through very real, physical (functional/material) means. Additionally, although many of us are comfortable with theorizing digital literacy and computer-based rhetorical strategies, not all writing instructors have—or should have—to master the subtle temperaments of university-wide computing infrastructures, which are often incredibly complex and vigorously distributed. For instance, at our institution, up until this past academic year, the unit that maintained the ceiling-mounted data projectors installed in each of the campus computer labs was physically and institutionally separate from the unit that
Fig. 5. Air conditioning units produce a great deal of noise, limiting sensory input.

Fig. 6. Collapsible wall allows for sound to carry between rooms, affecting sensory input.
maintained the computers. Both of these units were—and still are—separate from the unit that maintains the physical infrastructure of the room (e.g., ethernet connections, electrical outlets). And all of these units are separate from the unit that supplies and maintains the furniture in the room (e.g., chair, tables, cabinets in which DVD players and audio controller boxes live).

Yet, as the representative of institutional authority (leadership), students often see the instructor as responsible for addressing problems related to the functioning of material objects in a computer lab. In Western learning environments, instructors who do not know everything about their topic are seen as at least partially incompetent, and, therefore, a lack of ability to solve a functional/material issue in the network space can be a serious blow to the instructor’s leadership ability and thus ethos. This problem, potentially, has even more serious repercussions for those instructors or students who have physically marked bodies that dominant culture does not usually associate with technological knowledge the way that Anglo males usually are (see, for instance, Guillermo Gómez-Peña’s 1997 analysis of the ways in which “brown bodies,” specifically Latino peoples, are situated with technology).

4.3. The problem of how-ness: An analytical framework for hacktivism

We are fighting the classroom. (First-year writing student, personal communication)

We understand many of the issues that may interfere with teaching and learning writing in networked spaces to reside along the five categories we describe above, and usually in some combination—these categories are not, as we have indicated above, exclusive. To summarize some of the issues we’ve illustrated above and to identify the ways in which they co-exist with other issues:

- Computers arranged into rows (restricts movement, limits collaboration)
- Locked-down physical infrastructure (restricts movement, limits leadership)
- Limited space on tables or desks (restricts movement, limits collaboration)
- Sightlines blocked by cubicle-style arrangement or by ceiling-to-floor poles (limits leadership, impairs senses)
- Noise produced by collapsible walls or air-conditioning units (limits leadership, limits collaboration, impairs senses)

We see these categories as a helpful way to understand the problems that develop in these spaces. Having identified the “what”-ness of these problems, we move on to the “how”-ness of these problems as they combine to, potentially, disrupt computer-mediated writing classrooms. We provide an analytical framework that works by placing the learning objective on the left side of the matrix, then reading across to analyze the ways in which the five factors potentially disrupt the objective. Boxes are filled in as to “how” that issue manifests itself in the particular place of a particular classroom. The goal here is to understand the problem of a particular place in order to develop solutions to “hack” that issue (see Fig. 7).

Fig. 7 shows the framework in action. First, we place three typical pedagogical goals on the left side. For example, here we have chosen de-centering the classroom, supporting small group work, and maintaining student interest. We can then read across the framework and fill in each box with the “how”-ness a particular space interferes with each goal. For example, we may seek to create a de-centered writing classroom, but we might teach in a space that restricts movement and collaboration, because the space might have been designed with the understanding that the classroom space should be dominated by the instructor. Such classrooms often restrict movement, and sensory input is typically expected to come from the instructor. This makes student leadership difficult in such a space. Regardless of whether students come to trust themselves or their fellow students about writing-related questions, tasks, and issues, the topography of the room suggests that the instructor is the most important person there. Second, small group work, which is well-facilitated in traditional spaces where tables or desks can be easily moved around, is near impossible in technology-enhanced rooms designed in rows. Restrictions of bodies (movement), loud noises like air conditioning units (sensory), an inability to see each other’s monitors (sensory, functional/material), and inability to easily talk (collaboration/sensory) all drastically inhibit student ability to work with each other in meaningful ways.

4 When forced to encounter several functional/material problems in one of the computer labs in which his writing class was offered, one of the authors repeatedly stated to the students in his classes, “I got into this field so I wouldn’t have to do tech support.”
Third, disinterest can abound in such a classroom because ties to the activity of class are constantly disrupted. Asking students to stay focused on the tasks (leadership) we engage in and to be involved in the class (collaboration) is difficult when the student has to fight the very makeup of the room to pay attention—bending to see around pillars, for instance, or peering over flickering monitors, or straining to hear over air conditioning units (sensory). On the other hand, students, at their individual computers, have email, instant messaging, Facebook, and more at their fingertips, and it’s hard for us to work against such distractions if we can barely see students, and they have to strain to see or hear us. The answer to disinterest does not lie in digitally “locking down” student workstations so that they have no choice but to pay attention to the instructor5 (as if students had never before lost interest in class before the Internet), but rather lies in addressing new ways to deal with the sensory issues related to space.

Although the analytical framework is presented as a grid, the cells are not separate or discrete; issues are related and manifest differently depending on the pedagogical goal and other elements. For example, “loud noises” can appear in several cells, as it is a problem that can interfere in a number of ways. In addition, issues manifest differently as problems depending on the pedagogical goal. For example, “bolted desks” are problematic on three levels based on other situational factors: 1) bolted desks ensure that the students have to face the instructor; 2) bolted desks make student congregation around each other difficult; and 3) bolted desks mean that students cannot move to avoid physical obstacles like pillars. Just one trait, then, can interfere with pedagogy on several levels. This feature of the framework allows for overly simplistic answers to be avoided. Staying with the same example, if bolted desks are seen as the sole problem of a particular classroom, we might simply unbolt the desks (assuming that the infrastructure allows for that). Although this might solve the ability for students to not have to face forward, thus addressing the de-centered classroom, moving around the classroom would still be difficult. It is our hope that the matrix can be used as a tool that allows instructors and students to manage problems without overly simplifying them.

We also hope that this framework offers a particular tool for instructors to map the issues related to the spaces in which they teach. This first step, identifying and mapping issues, ideally leads to following steps—that is, to identifying the ways in which the space can be hacked to better support the work that we do in our technology-rich, collaboration-driven writing classrooms.

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5 One of us serves on a university-level instructional technology committee that advises the Vice Provost of Libraries, Computing, and Technology, and at least twice a year, a disgruntled faculty petitions to the committee to invest in technology that would allow an instructor teaching in a computer lab to lock down students’ computers so that students’ screens would freeze and they would be unable to do anything on their computers (and thus, the instructors often argue, they would then pay absolute attention to the instructor).
4.4. Hacking space

There are clearly degrees of hacking space. The larger-level approaches include petitioning for and designing instructional spaces. Those of us who have tackled this recognize the level of time and investment involved in such an initiative—time and investment that typically unfold over years. As we have mentioned, at our institution, space is centrally regulated and there are fewer than 300 public classrooms available. Thus taking just one classroom offline temporarily to redesign it significantly impacts our classroom scheduling system. And petitioning to make changes involves a minimum of five separate offices on campus and multiple campus personnel. Additionally, our redesigns affect the space and use of it; for instance, we recently redesigned a row-based computer lab in our building, and the redesign changed its capacity from 32 computers/seats to 22 computers/seats. Redesign is, however, often the most productive hack possible. We suggest the following for such hacking:

- **Know the system**: Do some research and figure out how space decisions are made at your campus. Often, larger campuses will have a unit that reports back to its stakeholders on an annual basis regarding campus development and space use; access these reports.

- **Know the people**: Figure out who makes the decisions regarding campus spaces and who feeds proposals to the decision-makers. Consider networking with individuals or units who have made successful space-related requests.

- **Know the methods**: While researching how space-related decisions are made, familiarize yourself with the methods of making space-related proposals. A misstep can be crucial in hacking space; if you complain to the wrong administrator, or step on someone’s toes, your proposal might get lost in the system.

A second method of hacking space—more reasonable and feasible for folks scheduled in the ways we’ve described above and folks who are our core audience here—is not to fight the space you’re in but rather to use it. One way to put the space to use is to develop methods to address the physical limitations in a particular space. Because we teach classes in which technology is a tool, a medium, and a focus of analysis, we integrate discussions of physical spaces and technological infrastructures in our pedagogy. Thus, we foreground constantly issues related to space. In the past, for instance, Doug has shared the framework we offered above with students in his class and invited them to visit, in small groups, different spaces on campus to identify the ways in which the spaces focus or disrupt the learning practices that take place with them. All too often, the physical processes and considerations of writing are left unexplored in our classrooms. Where writers have to go to do their work, the technology they need to write, and the effects of such travels and needs are very rarely, if ever, discussed in academic settings. Foregrounding these issues places them in front of students and also allows students to consider the effects of space and technology on their own literacies and composing practices. This move can also lead to the sharing of resources and the establishing of problem-solving behaviors.

Another pedagogical method is to rethink how collaborative writing work can be done in such spaces. When space is a premium or computers are locked in rows with little room to move around, three people finding space to talk and room to move is easier than six or seven. Requiring a deliverable from each group also allows the groups to produce using one computer. Encouraging students to work in small groups to delegate tasks (one such being the group scribe or group producer) better uses space. In this context, students can also be encouraged to use both physical and virtual means of collaborating; for instance, when students are in a space where they can’t easily see each other’s screens, they might share files digitally and edit them synchronously using a virtual space like Google docs or communicate via instant messaging or a chat feature embedded in the institution’s course-management system. With smaller groups, it is also possible for students to physically gather around one computer to see the work being done. With larger groups, students on the margins cannot physically see the work and tend to lose interest or lack significant participation. Such moments do provide the instructor with some anxiety, however, as even three or four students huddled around a single workstation, along with the restrictive topography of the class, can limit her movement around the class to “check up” on students. While it can be nerve-wracking not to monitor student work, we have found that the physical acrobatics of instructors involved in pushing through, over, under, or past bolted desks and other groups can be even more disruptive

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6 And this was not a random change but a very deliberate, hackivist change: we wanted to reinforce an argument we’ve made at our institution about capping writing classes; we thus used the space to physically reinforce this argument.
to the class than whatever “off task” conversations may be happening in classroom small groups. Instructors should not physically disrupt one group’s work just to check on the progress of another.

We also recommend accepting multiple forms of media for in-class writing assignments and encouraging students to have redundant analogue writing technologies (e.g., pen and paper, markers and transparency sheets) to allow them to solve problems in their own way and not be dependent on institutional infrastructure to accomplish tasks. If they can’t easily work around a shared screen, perhaps they can divvy up initial tasks, perform them on their machines, and then move to a space where they can sit on the floor or work at a table. This encourages students to be responsible and aware of the context in which they are writing. Additionally, such approaches to in-class writing clearly move writing technologies from the common tacit view to the explicit by foregrounding how technology shapes the composing process and the assumptions about (specifically writing) technology that cultures carry.

5. Conclusion

The national discussions currently ongoing regarding the design of instructional spaces offer us not only hope for change to come but also tools for making local arguments regarding space design. Along with these discussions, the past work of computers and writing scholars helps to provide a taxonomy of issues that require attention as we hack and as we redesign instructional spaces (be they virtual or, in the case here, physical). We have found that although many of these key articles and books were produced in the 1980s and 1990s, many of our instructional spaces were likewise designed in the 1980s and 1990s, making the arguments as compelling today as they were 20 years ago. And, we would argue, these arguments are all the more compelling today in light of the revolutions in classroom technology, many of which encourage, if not demand, more robust ability for us to provide spaces for students to work collaboratively and to work on projects that require movement, ability to hear and see, and more. We hope that our initial taxonomy developed from our literature review, and the specific framework we offer for identifying and negotiating issues in technology-rich learning spaces, provide our fellow teachers with useful tools to hack their local spaces.

The implications of viewing physical spaces as interfaces are many. Viewing spaces in this way continues a long, if currently neglected, tradition of understanding how issues of material access influence, but do not determine, ideological access and goals. Work on interface positions users as existing and ideally making change within complex ecologies of meaning influenced—but not determined by—space committees or room designers. By understanding interface as a positioning of subjectivities, we hope to be better able to identify opportunities for users to shape space both in small and immediate and in long-term and larger ways. In this article, we speak in terms of writing teachers and students as users of space—users hopefully engaged in distributing usability across contexts regardless of physical constraint. Instructors highlighting such “hacks” accomplish two very important goals for writing students in their courses: writing instructors that highlight the mundane and its effects on writing conditions teach students the usefulness of paying attention to the physical and material and their impact on the composition of texts. Paying attention, we think, is the first move in recognizing opportunity for the disruption or redistribution of power. Such disruption is essential to understanding that writing can and should do work in the “real world.”

Space design is rarely—if ever—accidental, and as many scholars of space have indicated, spaces construct the social, that is, the positions and activities of the people in that space. However, this construction is not destiny. Just as the initial uses of a tool do not determine its use forever, so space can be used, repurposed, and “hacked” with new goals in mind. In this way, we find that writing teachers have a long history of “hacking” things: genres, traditional classroom design, instructional methods, even the very definition of what writing is. In this sense, what we are proposing in this article is a continuation of a long tradition of understanding how something works, taking it apart, and reassembling it into something ideologically purposeful and useful for students and instructors.

It is in this vein that we hope our five-category analytical framework to analyze and intervene be taken, taken apart, reassembled, and repurposed for other physical spaces by users not just in socially networked computer classrooms but other social spaces that are built to facilitate mediated work. We hope to have provided a useful tool for students and instructors to understand and pay attention to the relationship between knowing the system, knowing the people, and knowing the methods. We find these to be key concepts for engaging in a praxis of change.
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