Forget to Clean-Up When You’re Done

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Abstract: In most university settings the rooms are scheduled centrally in such a way that even moving tables and chair configurations can prove problematic. Because different faculty use the space for different purposes, common courtesy and institutional exigency both dictate that classrooms should be reset to neutral at the end of each session. However, from the perspective of design pedagogy this otherwise beneficial practice becomes problematic. For design students there is a strong benefit in the material culture of the design space being intrinsically modelled in the classroom. We therefore offer an alternative argument to the conventional deployment of classroom space, based on three case studies from institutions in the USA and Canada where the opportunity has existed for various forms of material permanence in the classroom setting. The benefits to the students of leveraging materiality and material persistence in the classroom include: pedagogical benefits; efficiency; opportunities for mental reset; and more accurate discipline representation. Finally, and perhaps most importantly, embodied classroom environments support students more holistically by remembering that makers have both brains and bodies that need physical, psychological and emotional nourishment.

Keywords: design education; material design; material culture; embodiment

1 Introduction

The concept of information permanence has long been recognized as a benefit by design studios. From dedicated parts of the studio, to designated war rooms, to pop-up displays within the lab, these spaces allow design teams working at different paces and times to easily keep track of progress on a particular project. However, beyond information permanence, these spaces also often contain a variety of artefacts (objects, sketches, maquettes, tools, protocols, statements of policy or principles) that help orient the team. At IDEO, for example, creative spaces mean long communal work and meeting tables, hidden clocks, and a homey kitchen (IDEO, 2017).
Unfortunately, North American universities do not function like design studios. In many instances, even design programs—stubborn hold-outs against neutrality—have succumbed to university-wide scheduling and classroom allocation systems. This means that the same classrooms as are allocated for use by design students on Tuesday mornings, are used by general education students in the afternoons. Signs abound reminding occupants to return classroom space back to neutral for use by the next group (see Figure 1).

In some design programs, the solution to the problem of scarcity in dedicated space, is to allocate each (often, senior) student a desk within a large, shared space that becomes their work area during the academic year. Subsequently, it becomes common practice to move instruction to those shared student spaces rather than to use allocated classrooms. The downside of using student offices in such a way is that students end up with no privacy—workspaces that should be dedicated to them become public teaching spaces. Additionally, because these are often shared studios, the classroom schedule can interfere with students, out of class, trying to do work. The individualized nature of the student cubicles or desks is also at odds with the idea of a shared project space where multiple people have access to resources and are contributing to its outcomes. It makes little sense for large, collaborative projects to be divided up into a dispersed set of individual contributions, with students scattered across a space while working on those parts.

In thinking about the territory defined by issues of space, use, and materiality, we propose a four-quadrant model that builds on existing makerspace literature and culture (see Figure 2). To further our argument, we present case studies from the following three post-secondary programs: Information Design taught at Mount Royal University in Calgary, Alberta, Canada; Communication Arts at University of Waterloo in Ontario, Canada; and School of Art and Design at the University of Illinois at Urbana Champaign in the United States. In our model, manifest and neutral spaces are positioned on opposite ends of the x axis; and the material and the digital are positioned on opposite ends of the y axis. Manifest spaces are those that gather and maintain evidence of use, while neutral spaces are returned (essentially, cleaned) back to a state where previous use is no longer visible. Material defines thinking through making using physical materials and tools. Digital references technology-based environments (such as computers, tablets, virtual reality, environments, augmented reality, mobile interfaces, immersion studios, etc.). Though each space has
its own unique set of benefits and some downsides, in this paper we argue primarily for the value that comes with the manifest-material space type.

Figure 2. The intersection of space and making defines four types of classroom experience: (1) manifest-material; (2) manifest-digital; (3) neutral-material; and (4) neutral-digital.

2 Maker Spaces—Spaces for Making

The recent popularization of maker spaces has resulted in a revitalization and some diversification (at least from a disciplinary perspective) of the conversations surrounding the creative and pedagogical benefits of such spaces. Dedicated spaces where making occurs are not a new phenomenon, and neither is the notion of learning through doing that is a key aspect of the maker-movement ethos. According to Watson et al. (2016), “the epistemological roots of the maker movement can be traced back to the constructivist theories of Jean Piaget and John Dewey”, with recent contributions by Seymour Papert. Piaget (1973) called for reform in scientific education with the motto: to Understand is to Invent, and advocated students using active methods to rediscover knowledge. While the maker movement does share the conceptual structures of (and often partners with) STEAM initiatives, it has garnered some criticism that—through a STEM association—it is intentionally excluding other kinds of making, once again relegating (and, subsequently, subjugating) them to the realm of craft (Martin, 2017). In particular, women and people of colour have traditionally been held back from pursuing interests, education, and professions within science, technology, and mathematics; and, more importantly, when these populations have engaged in such making, their contributions have been minimized or outright removed from the pages of history (for one example, see Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race by Margot Lee Shetterly). Therefore, engagement with and leadership in STEM-based maker spaces by a diverse community is an absolutely critical and ongoing issue—the “lack of women in makerspace leadership and a pronounced tendency to see boys as more tech-proficient” continues (Kim, Edouard, Alderfer & Smith, 2018).

However, the maker movement has roots and could have futures beyond the paradigms and materials of science and technology. For design, spaces for making and remaking, as well as the conceptual tools and processes that support these activities, pre-date the Bauhaus. As with project-based learning (PBL), designers’ education is constructed through inquiry, with students gaining increased control over the selection of their topic, materials, process, and final products as they gain knowledge and training. Another common ground between design and PBL is the process of working towards a solution through an iterative cycle of making, receiving feedback and conducting evaluation, and remaking based on the results. Finally, both making and design projects are based on experiential learning, with making and design connected through a common set of activities that can have “playful or useful ends” and are “oriented toward making a product of some sort that can be used, interacted with, or demonstrated.” (Martin, 2014; cited in Watson et al., 2016). As far as these authors are concerned, there is no need for a hierarchy of materials or a STEM orientation when it comes to learning or thinking through making. Indeed, some of our best work has made use
of materials often ignored or undervalued by STEM, such as thread, sand, wood, fabric, balloons, tampons, and tape (see Figure 3 for one student example from Winter term 2018).

Figure 3. Does it Seem Like People Are Becoming More Easily Offended These Days? Final project in material data design by Dani Massee, Information Design, MRU, 2018. Photo by Radzikowska, 2018.

In terms of environments designed for learning, we can look to Resnick (2007) for an argument to treat learning environments like lifelong kindergartens. We can also consider the early childhood centres of Reggio Emilia, Italy, and the work of the Constructionist Learning Laboratory (CLL) at the Maine Youth Center that is based on them. In the Reggio approach, the classroom becomes the third teacher (in equal partnership with the parent and the instructor). It is a space filled with compelling artefacts, a variety of materials, and makes visible works in progress and evidence of the various stages and types of learning (Edwards, Gandini & Forman, 2012). In modifying the Reggio triad in order to suit the incarcerated nature of its learners, the CLL placed an even greater focus on the learning space, turning it into a “school based on constructionism, tinkering, making and personal computing” where, for five hours each day, “learners could soar above their otherwise impoverished and punitive conditions” (Stagger, 2013, p. 487).

There has been much fruitful discussion about the benefits of makerspaces, and several notable texts now exist providing direction on how they can be set up in all manner of classrooms and institutions\(^1\). We are interested less in the creation of makerspaces or in their use in-the-moment, and more in investigating the nature of the manifest space—space where persistence of maker objects is of primary importance:

- the pedagogical benefits of working while surrounded by evidence of work;
- classroom conditions for material persistence;
- opportunities for mental reset; and
- discipline representation.

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\(^1\) See, for example, Makerspaces: Materializing, Digitizing, and Transforming Learning, Koole et al., 2017; or Makeology, Peppler et al. (editors), 2016.
3 Material-Based Reminders

It is well known that repetition aids memory formation (Hintzman, 1970). One way to accomplish this repetition efficiently and easily is to use objects that either metaphorically or literally represent core concepts. For example, one of our co-authors teaches theatre in a studio at the University of Waterloo, where stage design maquettes created by her colleague William Chesney for productions at the university and elsewhere (Chesney, personal communication), are kept on shelves along one wall (see Figure 4). The maquettes can be used as direct pedagogical tools, for teaching stage design, maquette-making, performance history, and performance analysis. They can be used as tools to help conceptualize a production-in-preparation, and also as technical plans to communicate to technicians and stage crew how to build a set once designs have been completed. They assist in rehearsal by showing directors, stage managers and performers not just the ground plan, but also the vertical levels of a set. And since maquettes capture a moment in the design process that typically continues iteratively right up until opening night, they also provide (especially when cross-referenced with other production records), an opportunity for the meta-study of theatre creation practices.

![Figure 4](image)

An important feature of the maquettes is that they serve as a form of institutional memory. Whenever they are drawn to the students’ attention, they evoke a recollection of the number of kind of productions that have been designed and produced by previous generations of students and faculty. Current work-in-progress is always contextualized by, compared to, and competes with the work of the past. This awareness has the potential to be invigorating. No matter what else is happening at the time outside of this theatre-making space, everyone working in this space is in a place where work is and has been conceptualized, accomplished, and presented. Further, the collection argues that the work is important enough to be remembered. Whatever design the students are currently creating with their instructors, its maquette will also find its place on the shelf among the others as part of the living record of the school (see Figure 4). At its worst, this kind of institutional archive can serve only as a form of nostalgia in which people look to the golden age of a past that can never be recaptured because of the many constraints and failings of the present. However, when artefacts like these are not fetishized as monuments to the past, but actively used in the ways we describe, they act as access points to an expanding repertoire of practices shared over time through collaborative work. In other words, they can enable a making-based design memory similar to the repertorial memory recognized in performance studies (Taylor, 2003) as distinct from archival memory.

In addition to the five repetitions that aid memory, it is often useful to have a way to signpost core lessons learned in previous years or classes. For example, students at Mount Royal University (MRU) are introduced to the Gestalt principles in their 1st year. In their 3rd year, they need to be putting these principles into practice without a long and complicated re-learning process. To be able to point to an infographic where similar items are indicated through grouping allows this reminder to take place with a gesture and a few framing words (see Figure 5).
4 Pick Up from Where You Left Off

It is helpful to keep in mind that class time is rare and precious. For many students an hour of class time costs more than an hour of a first run movie. Although it is possible to do project work outside of class, it is often advantageous to have the instructor available for immediate feedback and colleagues nearby for quick conversations, critique, and collaboration. With this in mind, time spent recovering the work state from the previous class is almost always time wasted.

In addition to the material considerations, there’s also a cognitive benefit to students being able to pick up where they left off quickly and efficiently—it can sometimes happen that seeing the work in progress after an interval can result in new inspiration that can either allow the project to make a leap forward or pivot it in some productive way. For classrooms that are not booked solid, there can be opportunity for students to use the space as a work area outside of assigned class time.

What we are proposing is not that everyone drop tools and march from the room when the whistle blows, but rather that a few minutes be taken at the end of each class to prepare the workspace for the next class. Loose, light-weight items, for example, might be taped down temporarily, or a note might be left about the stages of the process already completed. In some instances, the work can also be set aside off the main workbench on shelves or lockers appropriate for the purpose.

5 Multi-Use

One of the more interesting examples of the benefit of material persistence comes from colleagues working in theatre and stage design. Although it is seldom possible, for reasons of scheduling, it can sometimes happen that a small theatre space is available for as much as an entire semester by a single production (Figure 6). In a case like this, the various members of the creative team—from directors, to actors, to set and lighting designers, to technical crew—can all work towards refining the production by collaborating both in unison and in situ. This process was recently tested in Studio 180, a teaching studio at the University of Waterloo, during the creation process for Welcome to the Tree Museum (Plowman, Houston, et al. 2019), produced and performed in the Theatre and Performance program between January and March 2019. The lead design instructor, Professor Paul Cegys, observed three categories of pedagogical benefits: first, when students were at liberty to make a mess, and could work continually through the mess, they engaged in a deeper exploratory prototyping process; second, students took more pride in their work, which was implicitly valued more highly than usual because it was not marginalized at the end of each work session (Cegys, 2019). Third, and most relevant for this part of our argument, Cegys observed that the simultaneous multiple uses of the room promoted a collapsing of roles or dissolving of the departmental lines that normally differentiate the work of, for example, set designers, lighting designers, and video designers. Sharing the Studio 180 space resulted in a much closer collaboration and integration of set, light, and video in Welcome to the Tree Museum (Cegys, 2019; and see figures 6-13, which show the transformation of the teaching space over three months through all phases of design, production, and performance).
Although generally positive, these sudden realizations can also be difficult and even traumatic depending on when they occur in the process. These might be because they represent actual errors that need to be addressed, but it can also be because they represent hitherto unrecognized opportunities for excellence that, in some instances, can be even more disruptive for a project that is already underway and operating under tight constraints. At this point we feel compelled to point out that there is more than one response possible when anchored in the actual practice of design consultancy. Some people may say that such scope creep is the sin of the holy ghost of industry, while others might argue that more often than not it is a chance to communicate with the client/team about an opportunity for greatness that could be achieved with even relatively minor increases in scope and budget. In some cases, the tyranny of deadlines can be stricter at the university than in industry given the hard deadlines of the university calendar.

It is not only these rare moments of inspiration that are made possible by a space shared by multiple stakeholders; in fact, this approach can also benefit the day to day tasks of communication both between and within groups. These moments of recognition would not be possible without shared space and materials of the works in progress. For designers of other kinds, it is seldom possible that the workspace at some point eventually becomes the final deployment space of the design; however, the many valuable lessons to be learned from the theatre design community can be leveraged for benefit in the classroom right up until that moment. As an example of the advantages

Figures 6 (a-h starting from top left to bottom right): HH180, the University of Waterloo Theatre and Performance Program’s studio theatre. (a) Future space Welcome to the Tree Museum (Spring 2019). Photo by Radzikowska, 2018. (b) Lighting designer Chelsea Vanoverbeke and student actor Samantha Mirandola participate in set construction activities. Photo by Janelle Rainville. (c) Student assistant stage manager Madie Bennett hangs set pieces. Photo by Janelle Rainville. (d) Student lighting crew member May Nemat Allah hangs a lighting instrument. Photo by Janelle Rainville. (e) (bottom-left to top-right) Sound designer Colin Labadie, student head of lighting Nicole Reid, designer Paul Cegys, designer Chelsea Vanoverbeke, student stage manager Selin Erkaya, and student lighting crew member Kendalin Bishop test set, light, and video design. Photo by Janelle Rainville. (f) A test of set and lighting. Photo by William Innes. (g) A test of set, lighting, and video. Photo by William Innes. (h) Set, lighting, and video with actors (left to right) Shamanta Haider, Brooke Reid, Samantha Mirandola, and Reid on stage during a performance. Photo by William Innes, 2019.
of a shared workspace, one of the authors had the opportunity to share a studio with two colleagues. One was from graphic design (Eric Benson) and the other from architecture (Mark Taylor). Eric has his students make paper out of unusual crop residues and Mark is developing some similar approaches to the creation of alternative building materials. The proximity of these other projects led to a new initiative in using alternative materials for paving bricks. In the end, more than a dozen different materials (Figure 7) formed the basis for a series of reflections on walking surfaces and their properties. Most recently, the biologically inert resin-based binder for the first set of pavers is being replaced with an even more sustainable binder that uses mycelium from mushrooms (Figure 8).

![Figure 7](image1.png)

**Figure 7.** 17 alternative materials for paving bricks. Photo by Ruecker, 2018.

![Figure 8](image2.png)

**Figure 8.** Paving brick made using a more sustainable binder—from mushroom mycelium. Photo by Claudia Grisales, 2018.

### 6 Transition

As a design opportunity, liminal spaces provide a chance to prepare people for the mental activity associated with the primary experience. In the case of theatre lobbies, the primary experience will be a play or performance; in the case of design pedagogy, the primary experience will be the learning that takes place in the classroom.

In some of our previous work on liminal spaces, we considered entrance ways into public events as providing opportunity for people to reflect on either what they were about to see, what they were in the middle of seeing (i.e. the intermission), or what they had just seen. What we were primarily interested in was the role of opinion and
whether or not it could be possible to shift people from holding a single opinion to entertaining simultaneous, multiple, possible interpretations (Roberts-Smith, Ruecker, et al., 2016; Ruecker, Radzikowska & Roberts-Smith, 2017; Ruecker & Roberts-Smith, 2017; Ruecker, Roberts-Smith, et al., 2016). Although this goal is also shared in many classroom experiences, it is only one of the many ways in which it is beneficial to prime students or help them prepare for the classroom.

Figure 9. A makeshift gallery space in a small hallway between a main campus artery and a design classroom at MRU. Left image: hall with the door closed; right image: same hall with the door open. Photo by Radzikowska, 2019.

Figure 10. Genius loci boards, meaning the spirit or distinctive feeling of a place. Based, in part, on Larissa Fassler’s work, an artist who maps unconventional characteristics of places. Work on display by students in COMM 2673, Fall 2018, MRU. Kelsey McColgan, Instructor. Photo by Radzikowska, 2018.

Other examples include reminders of previous concepts covered, core ideas that are being explored in ongoing ways, projects at various stages of completion and where they are in the process, and even the larger learning objectives of the class. For example, while working on the tail-end of a semester-long material data project, one of the co-authors
(Radzikowska) wrote on a white board placed in the entrance corridor to the classroom the goals, activities, and deliverables for the last three weeks of the semester. Those items remained there as a reference point and visual reminder till the end of term. This was really only made possible by a quirk of architecture where the location of the classroom was in a cul-de-sac so that the entrance hallway served as a transitional space between the rest of the school and the classroom, rather than a public space (see Figure 9). Other items placed in this corridor included a display of past projects from the current class and mockups of the current project in progress.

The benefit of having the work in progress remain on display is that it can serve as a basis for critique at any time, including, outside of assigned classroom time (see Figure 10). One approach we’ve taken, for example, is to provide students with sticky notes and instructions around what constitutes constructive feedback.

7 Immersion

Once the students enter the classroom, they are immediately immersed in a working environment where the current phase of the project is available for reflection and alteration. There is an important distinction between work as useful reference and garbage. The former requires a returning to—a repeated extraction of value through engagement with the object. The latter should be cleaned up, re-purposed, or recycled regularly. For example, we have created re-purpose bins for scraps of material that have some remaining value. However, caution should be exercised when it comes to recognizing that what might look like a piece of garbage could actually be a very important element in someone else’s thought process (see Figure 11).

One of the advantages of an ongoing room for works in progress is a visible challenge to the false idea that design springs fully formed like Athena from the forehead of Zeus: that, instead, good design is the result of repeated cycles of improvement. This is far more difficult to demonstrate when work takes place in the virtual environment than when ideas are embedded in material form, because virtual environments (being digital) typically seek to replace old drafts with new ones, rather than accumulating a panorama or a palimpsest of drafts.

Given the right conditions, it is even better to include, within the classroom, work in progress from different years. That way, the expectations of students who are newer to the program, about what constitutes their future work/effort, are managed through no additional effort. The same principle can be applied, if it is possible, if senior students are immersed in the work in progress of faculty. While teaching at the University of Nebraska in the Hixson-Lied College of Fine and Performing Arts, one of our co-authors observed just that—a world-renowned ceramicist and faculty of the College experimenting with specialized glazes along-side undergraduate ceramics students learning their first formulas. One distinction, however, must be made between faculty and classroom projects: there is a time constraint in a semestered class structure, while it is unusual for faculty work to be limited by four-month time
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frames. It is a common occurrence for us to pick up a project off the office shelf that has been percolating on the back burner for a year or more. However, even in the scenario where a faculty member’s project progress extends across years, making that progress (and lack thereof) visible to students provides them with valuable insight into intellectual life.

8 Embodiment

It has been extensively argued elsewhere that making is a kind of thinking (as a start, see Maeda’s The Art of Critical Making, 2013); that, in fact, a better designation of Homo sapiens, wise people, would be Homo faber—people who make. We now recognize that making and using tools is not a unique human attribute, but it seems relatively incontestable that we have done more with it for longer than other species, and with greater impact on ourselves and the world around us. To make something is to instantiate an idea. Or is it? Perhaps to make something is to simultaneously produce the idea of what is being made. Theorists like Herbert Simon, an economist with an interest in engineering, stressed the industrial model of design, which places emphasis on planning (devising) rather than actual fabrication: “to design is to devise courses of action aimed at changing existing situations into preferred ones” (Simon, 1988, p. 129). However, pre-dating Simon, designers such as William Morris and the professors and students of the Bauhaus strongly believed that making was not subordinate to planning (see Meggs, 2016). So, if we consider the designer not just as a planner but also a maker, then it becomes important to accommodate the fact that makers are not just brains inhabiting bodies, but that embodiment is central to the activity. Bodies need nourishment, rest, a variety of working surfaces (not just tables and chairs), adjustable temperature, light, air, a sense of passing time, opportunities to separate from the group, and opportunities for reinforcing social relationships (see Figure 12).

![Figure 12. HH168, the University of Waterloo Theatre and Performance Program’s dressing room and technical booth.](image)

9 Conclusion

We have argued in this paper that there are advantages in design pedagogy to being able to treat the classroom more like a design studio than like a routinely neutralized learning space. This is particularly important because of the materiality that is an essential component of design pedagogy. Students in design learn by making. They think through making. They explore concepts through various forms of tangible discourse. Of course, there are other disciplines on campus that share these needs, but the vast majority of campus architecture and space management has not been designed with material persistence as a priority.

To conclude, we offer our current version of best practices for constructing a manifest-material space. We say current because we consider space creation, like all our design efforts, to be an iterative, experimental process.

1. Wherever possible, make use of liminal spaces as entryways to the creative space. These transitional spaces can be used to provide team members with memory, inspiration, celebration, and confidence.
2. Materials need to be in a configuration of their use, not their storage.
3. A space shared with material persistence for one team can also be a resource for other teams working in adjacent areas of the same project.
4. Keep in mind that material persistence can encourage moments of fertilization and can equally serve for routine communication.
5. The work of making is embodied work. Do not forget about ready access to cold brewed coffee, a fridge, microwave with popcorn, and places to catch a quick nap between work sessions.
6. Try to keep in mind that the tone produced by material persistence should be invigorating not sentimental.
One consequence of the workarounds that allow persistent pedagogical maker spaces to be implemented even when they are not institutionally allocated, is that many such spaces are the ones that have fallen through the cracks of university management systems. They are oddly shaped, repurposed storage areas, sometimes little more than closets with no ventilation, inadequate lighting, low ceilings, and inappropriate flooring, furniture, and equipment. Perhaps needless to say, the difference pole from each of these failings would comprise a list of the optimal configurations.

There is also a fundamental problem in that universities typically do not have the resources to dedicate a full-time room for every class. The unenviable situation we find ourselves in is as much an outcome of austerity as it is anything else. One of the features of a reconceptualized university with proper funding (see our forthcoming book) would be space planning optimized for pedagogical effectiveness rather than fiduciary constraints.

![Image](image.png)

*Figure 13. Non-consensual fish phallus. Microaggression by ANON; project board owned by a group of 1st year Information Design students. MRU. Photo by Radzikowska, 2019.*

Finally, the micro worlds we create within our design classroom are bound to reflect both the positive and the toxic aspects of our human interactions. For example, Figure 13 is an example of vandalism perpetrated against a student group project that had been stored in a common space at Mount Royal University in the Winter 2019 semester. In arguing for material persistence, it would be irresponsible of us not to acknowledge the human potential for toxicity, nor the fact that it is more likely to be directed at vulnerable or marginalized populations—often based on socioeconomic status, disability, gender, gender expression or identify, sexual orientation, race, ethnicity, nationality, or religion (the vandalism in Figure 13 was perpetrated against a group of female students of colour). Encouraging students to co-create (have ownership over) their learning spaces (and not to clean up after they’re done), can result in toxic interactions between students, microaggressions, or damage to student work (see Figure 13). Part of good pedagogical practice in the kinds of environments we propose must therefore include strategies for managing the space in the same way that it is sometimes necessary to manage toxic moments in the classroom (see Martinez, 2015).

**References**

Cegys, P. Interview with Jennifer Roberts-Smith. 21 March 2019.


Martin, K. (2017). Centering Gender: A Feminist Analysis of Makerspaces and Digital Humanities Centers. Invited talk at the IDAH Speaker Series, Institute for Digital Arts and Humanities, Indiana University, USA.
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