Collaborative Workspaces:
The Evolving Role of The Industrial Design Studio Space in Higher Education
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Industrial design has increasingly been thrust into the spotlight as a newfound push for innovation has become a key differentiator for companies to succeed on a global scale. In recent years, publications such as *BusinessWeek* and the *Harvard Business Review* have devoted entire sections of their content to innovation, and have contributed considerably in raising the awareness of design as an innovation catalyst within organizations. Not surprisingly, as the demand for designers in business has grown, so too has the demand for design education.

Over the past fifteen years, the profession has witnessed a 42% increase in the number of NASAD-accredited industrial design school programs, with 34% of that growth being in the past five years (*IDSA Directory of Industrial Designers* 1993–2008). As the scope of profession has expanded, design schools are continually being asked to mirror practice by integrating increased computing technology, rapid prototyping, and specialized coursework within their curriculums. In addition, the design profession has continued to gain momentum by working collectively with other disciplines in the design process, and educational design programs are seeing interdisciplinary collaborations as the new language of innovation.

Increasingly, RFPs for large grants and external funding are seeking interdisciplinary efforts spread across colleges and departments, not just concentrated in design. Universities and research institutions are discovering the value in teaming dissimilar disciplines on campus to offer a diverse set of viewpoints and fuel innovation on projects. In addition students often collaborate with corporate sponsors giving students opportunities to work with multiple disciplines within a company. Throughout most student design projects there is also collaboration of peers within the class on a daily basis.

With the emphasis in education shifting towards collaborative learning and working, questions are raised: Just how collaborative are our educational design studios, and are these studio environments and the components they contain effectively preparing students for these interdisciplinary efforts?

National Educational Design Studio Survey: A Snapshot of Studio Spaces

For many professional designers, looking back to their time in school provides a mixture of thoughts involving blue-sky projects, demanding professors, and all-night work sessions. The long hours spent slaving toward a presentation critique provided both design training and a rite of passage into a rewarding and often demanding profession. For the most part, these aspects of design education are still present within the school experience despite the broadening of the profession's landscape.

Traditionally, discussions on how to teach collaboration have focused on revising educational practices and course content. Rarely are the physical workspace configurations and components considered as vital tools for preparing students to be professional designers. Nevertheless, the environments in which students work often play a key role in how effectively they execute the design process, and how they expect to collaborate in their future workplace. Classroom environments that accommodate multiple channels of information flow and are flexible to adjust with individuals as the goals for collaboration change will likely foster more productive collaborative output from students.

In the fall of 2006, thirty design schools from across the US were given visual/verbal survey kits in order to gain a more clear understanding of the current specifications of the typical educational design studio. The schools surveyed included a variety of the more prestigious and historic programs in addition to a mix of public, private and regions. All of the schools currently teach industrial design and are accredited by the National Association of Schools of Art and Design (NASAD) as formalized by the 1984 IDSA/NASAD agreement. Thirteen private and nine public design education programs responded to the survey by

visually and verbally documenting their studio environments: the workspaces, the storage areas, the shared functions, the lighting, students at work, and additional components within the spaces. (Figure 1.)

Figure 1. National Educational Design Studio survey kit.

Specific questions that the survey intended to answer were: What is the typical number of students within each studio? How many class time hours per week are spent in studio? What lighting sources are in your studio? How do you use computers in your studio? What are the dimensions of your studio space? What is the working height and size of the workspaces? What types of seating are in your studio? (Figure 2.)

Figure 2. National Educational Design Studio survey questions.

In addition to the specific questions, the visual information submitted was intended to give a view into how static or dynamic the furniture and props are in each studio space. A disposable camera and tape measure were included with the survey in order for the participants to fully document their studio spaces and the components within. This visual data compiled from the surveys gave a unique view into each studio space that corresponded and gave clarity to the answers given. The following represents data gathered from this survey:
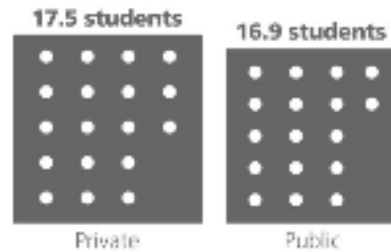

Figure 3. Average size of studio spaces.

Figure 4. Average class sizes in studios.

Private educational studio spaces average 14% larger in square footage (1607 sq/ft) than public spaces (1389 sq/ft). This comes as no surprise since private institution facilities are often more dedicated for their specific disciplines than are public universities. (Figure 3.) The general perception that studio class sizes at private institutions are smaller than public universities may, however, be incorrect. (Figure 4.) Within this study, it appears as though both public and private institution studio class sizes are very similar in size with public classes being slightly smaller (16.9 students vs. 17.5 students).
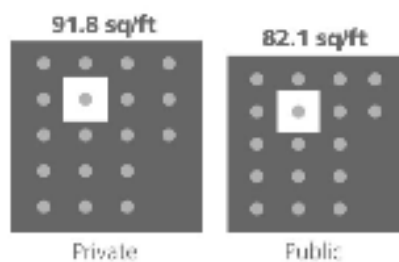
Figure 5. Average individual student space.
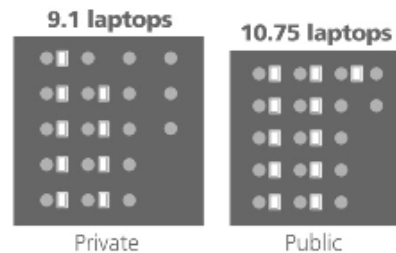
Figure 6. Average number of laptops in studios.

While the class sizes of the design studios may be similar between public and private institutions, private schools clearly offer more square footage studio space for each student to work within. (Figure 5.) This translates to effectively 11% more individual space per student in private educational studios (91.8 sq/ft) over public (82.1 sq/ft). It is important to note that this square footage pertains only to working studio space, not separate computer labs, shop facilities, meeting rooms, etc.

Computer use was present in every studio surveyed typically in the form of laptops, shared workstations, or a computer lab area. 68% of studios are equipped with a projector that supports computer-aided teaching. Laptop computers are used by approximately half of the students in studios in which they are present (Figure 6), with a greater use by public university students (69% versus 44%). It is also likely that the number of laptops used in both public and private studios has increased significantly since this survey was conducted due to the increased availability of wireless networks across campuses.

91% Studios have Natural

100% Studios have Fluorescent

Figure 7. Most common lighting in studios.

11.4   10

Private   Public

Figure 8. Average class hours in studio per week.

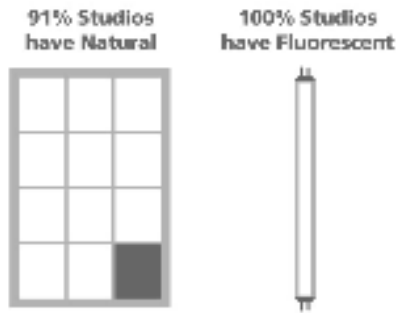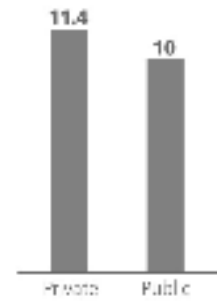All the studios spaces surveyed employ fluorescent lighting, and all but two have some form of natural lighting present. (Figure 7.) Both public and private design programs spend a large number of weekly class hours in the studio spaces with private institutions requiring more time (11.4 hours) than do public university programs (10 hours). (Figure 8.)

82% of studios have dedicated workspaces for each student while 18% have "hot seat" workspaces between classes. These dedicated workspaces tend to become a "home base" for a student throughout the workday and often include some level of personal storage. "Hot seat" studios tend to remain clear of storage around the workspaces with students typically removing and storing their equipment and supplies elsewhere after class. Most studios used a combination of both low and high work surfaces. Approximately half of the educational studio spaces used standing height work surfaces (above 30 inches) as their primary work surfaces for students. These workspaces are usually in the form of some type of drafting board and stool combination. (Figure 9.) In many ways, the elevated drafting board/stool convention seems outdated in the educational design studio. Accommodating laptop computer use requires most drafting boards to remain in the horizontal orientation more like a desk. Unlike a desk, however, the flat-oriented drafting boards are often too high to sketch effectively at arm's length and are uncomfortable for extended work times for shorter female students.

39" high worksurface   30" high worksurface
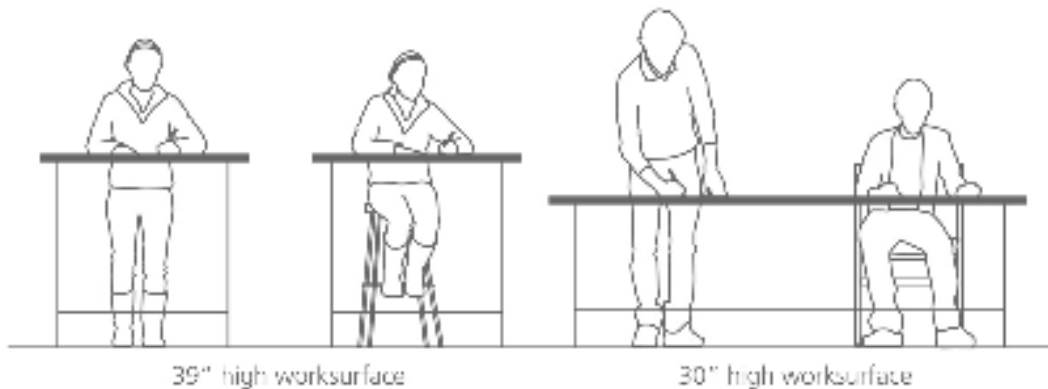
Figure 9. Both high (drafting boards, 35"–39") and low (desk, 30"–32") work surfaces
are used equally in educational studio spaces.

In addition to individual student workspaces, 72% of studios include shared workspaces such as cutting tables and meeting tables. These shared workspaces tend to be lower in height (30"–32"), and do not appear as frequently in studios with limited square footage. Almost all of the studios (86%) incorporate whiteboards and tack spaces, both of which add flexibility in teaching and collaborative thinking.

Figure 10. Fixed configurations and elevated work surfaces common within today's educational design studios.

Open Plans with Fixed Furniture

Perhaps the most interesting observation in this survey is the general lack of ability to reconfigure the educational design studio. Nearly all of the educational studio spaces employ an open floor plan in their building which lends itself to changeable, flexible use. Yet, the vast majority (78%) of these spaces house large-scale furniture that is static and difficult to move. (Figure 10.) While most of the seating can be easily relocated within the space, only a few studios use work surfaces with rolling casters. Despite this tendency toward a single, fixed configuration, nearly all the respondents surveyed rated their studio space as more collaborative than individual in nature. This could be due to relative comparisons with other lecture-based classroom spaces on campus that use permanently fixed arrangements.

Collaborations require a joint dynamic between multiple people. Collaborative learning is a dynamic between teachers and students across each day. Corporate collaborations demand exchanges between students and professional clients in presentations. Interdisciplinary collaborations require bringing unfamiliar people together in surroundings that foster interaction throughout the different phases of a project. While some of these interactions can occur in spill-over spaces, often the design studio is the hub of project creativity. With so many different interactions of people, for so many different reasons, at so many different points in the collaboration, doesn't it make sense for educational design studios to "move and breathe" like a project itself?

The notion of dynamic spaces is not at all new and has its origins in the professional workplace. In the 1960s, Herman Miller began to recognize the need for offices to design flexibility into their furniture systems in order to better exchange ideas and information. "Curiously, it is the lack of mobility in our physical facilities that is the most stubborn laggard in offices. A great many of our irritations stem from services and facilities that respond too slowly, or not at all, to our new objectives and values. It is our buildings, furnishings and services that have to be revisualized and revitalized." (Probst, 1968)

The Ideal Educational Design Studio

When defining an ideal educational design studio, three areas of emphasis should be considered:

1. Design educators should be able to actively engage students throughout the class time by changing teaching modes and by altering the studio space. The configuration of the studio space for critiques should alter from that of one-on-one input, or lecture demonstrations. Currently, static studio arrangements allow for limited adjustments. Strange & Banning (2001) point the need for campus facilities to encourage student involvement: "The extent to which the design and layout facilitates interaction of participants is thought to be an important antecedent to involvement. Spaces that encourage individuals to spend time interacting with others are described as 'sociopetal' or 'socially catalytic' spaces." In addition, the importance of how a classroom is arranged and the components it contains contribute to the effectiveness of the course: "The physical arrangement of the classroom can

make or break active learning. The 'interior decorating' of active learning is fun and challenging (especially when the furniture is less than ideal)" (Silberman, 1996). Each classroom layout offers distinct advantages and disadvantages, but within the definitions of these layouts there are some common themes that an active classroom should make an effort to employ:

Encourage face-to-face interactions for team work.

Elevate "the class" above "the teacher."

Provide both shared and individual work areas.

2. People or professionals from other disciplines less familiar with design should feel comfortable, equal and engaged when exchanging ideas in the studio. There should be minimal barriers to open discussion, and the ability to "zone out" areas of the studio to work within "on the fly." Fixed high work heights and uncomfortable drafting stools are less than adequate. The unique role of the design studio space also creates an inherent need for students to feel creative and at ease with each other in the space throughout all hours of the day and evening. Some of the attributes of a "third place" are described as follows:

Neutral Ground: "…places where individuals may come and go as they please, in which none are required to play host, and in which all feel at home and comfortable."

Conversation is the main activity: "…the talk there is good; that it is lively, scintillating, colorful, and engaging. "

Accessibility and Accommodation: "one may go alone at almost any time of the day or evening with assurance that acquaintances will be there…Traditionally, third places have kept long hours." (Oldenberg, 1989)

3. As the phases of the project (research, ideation, concept development, finalization, etc.) require unique demands for the individual student, individual workspaces should be able to adjust and accommodate.

The ideal space that emerges and begins to fit this description is also beginning to be found in the workplace as a center of innovative thought. The "war room" or "incubator space" has been described as *"…a space type geared toward innovation and idea generation. It is being built for young, dynamic entities to use, yet traditional corporations are creating similar spaces distinct from their typical work environments to grow ideas and 'incubate' innovation"* (Antonelli, 2001).

Conclusion
As the value of interdisciplinary collaborations and diverse work modes grow through design education to generate new sources of funding and innovation, so must the flexibility of the physical components that support and foster these efforts. The challenge for design education programs is this: develop educational design studio facilities that are as interdisciplinary as the design profession.

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