



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# DESIGN CENTER

## Project Prospectus & Program Summary

August 2015

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## EXECUTIVE SUMMARY

The Design Center at the University of Illinois at Urbana-Champaign will provide a new means of channeling students' developing expertise, passion, and creativity toward issues and lives of consequence. Students will explore ideas and master skills through action—immersing, designing, making, doing. Illinois will become famous as an incubator of outstanding young talent with a new and exceptional collection of skills, fostered by a culture of multi- and trans-disciplinary education and student-led problem discovery and problem solving.

The project's aim is to bring the campus together through a cyber-physical network: faculty and students, in spaces throughout the campus, connecting with communities and challenges around the world. The network will facilitate collaboration and learning across disciplines, realities, and cultures, through diverse experiences bold in problem framing, rich in design thinking, and uninhibited in risk taking.

The catalyst for this learning network will be an iconic new facility: its central station and headquarters. The Design Center is a hub where our campus community discusses, questions, thinks, gets inspired, dreams, conceptualizes, invents, creates, and innovates. The Design Center *convenes* people, *immerses* them in understanding meaningful challenges for which they *design* solutions, and *connects* them to a network of campus, community, and global resources. Embedded in this broader network, the Design Center is a beacon of our institutional commitment to education and discovery with societal purpose and relevance, as we engage with the world—to act, to lead, to change.

Students from all fields will collaborate as they participate in the design process: discovering, understanding and redefining problems through immersion to develop informed empathy as they create and refine solutions of all kinds. Doing so requires an atmosphere that marries problem understanding and definition, collaborative ideation, and problem solving with a philosophy of continuous prototyping and testing. Those are the lessons embedded in the very best design initiatives underway at other universities, including Berkeley and Stanford.<sup>1</sup> At Illinois, our vision is to tightly connect understanding, designing and doing—and to do so with a degree of multi-disciplinarity and emphasis on immersive understanding of problems that surpasses the current standard in higher education and creates a unique basis of distinction. This immersion will build on our tradition of deeply understanding global challenges and join it with world-class expertise in augmented and virtual reality. Illinois will extend design thinking and doing—design learning—beyond any previous efforts. The effort also seeks to facilitate design that includes non-physical objects, processes, solutions, and programs. In all of its work, the Design Center will be connected tightly to campus and community, granting users access to world-class expertise and facilities. The Design Center will provide opportunities for students befitting a preeminent public University with a Land Grant mission and global impact.

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<sup>1</sup> Berkeley's Jacobs Institute is guided by a philosophy captured in the slogan "Moving from design thinking to design doing." Clearly imagined as a differentiator from Stanford, the West Coast home of design thinking, Berkeley is joining thinking and doing by linking the new Jacobs Institute and adjacent and networked fabrication facilities in Mechanical Engineering, with the intent of enabling students to create and test their ideas through various levels of prototyping in both curricular and extra-curricular modes. At Stanford, although students in the well-known D-school are focused on the more conceptual aspects of design thinking, they are able to use the nearby, extensive, and accessible Product Realization Lab (PRL) to implement and execute their ideas. The D-school and PRL make up a complete design-and-doing package, suggesting that the Berkeley and Stanford models are more similar than either institution may realize.

## PROJECT SCOPE

### Values

The Design Center will be a highly flexible space, built with the expectation that internal spaces will change over time to fulfill a number of roles, sometimes on a daily basis. While many spaces will be modular and flexible, the values of the Center and its role at Illinois will guide decision-making now and throughout its expected evolution.

- **Connection across people and disciplines.** The Center is a focal node in the campus ecosystem for learning and making.
- **Inspiration at Illinois.** The Center manifests the inspiring heritage of ‘making’ at Illinois. Evidence of this heritage is built into the physical space of the Center.
- **Implementation of Land Grant mission.** The Center links with the communities, both local and global. It helps users design, test, and improve creations of social, commercial, and cultural purpose.
- **Openness and transparency, physical and virtual.** In principle, walls are glass unless there is a requirement otherwise. All content and opportunities are readily accessible online.
- **Bias for action.** All spaces lend themselves to action.
- **Generosity of support and spirit.** Staff and users, regardless of disciplinary background, help each other. Ideas are shared. There is a strong presence of expertise on site— faculty, staff, and technical experts (including student workers). Help is always available and freely given.
- **Part of the whole.** The Center is a connector to many units in the cyber-physical network; it supplements and connects to existing resources rather than replicating them.
- **Immersion as innovation.** Cutting-edge technological innovation in virtual reality meets in-depth understanding of marketplaces and communities, extending Illinois’ rich inter- and trans-disciplinary tradition.

These values are in line with the University’s ambitious goals of creating transformative learning experiences, addressing pressing social problems through innovation, and generating even more multi-disciplinary work of consequence.<sup>2</sup>

## MISSION

Design—the intentional effort to harness creativity to meet needs and solve problems—is not the sole prerogative of any discipline. It is a bridge that connects the physical, biological, behavioral, and social sciences; humanities; engineering; and the arts through application. Design learning—or learning through design—provides a powerful means of advancing the Land Grant university’s

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<sup>2</sup> For more information, see the *Visioning Future Excellence* Outcomes Report and supporting materials at <http://oc.illinois.edu/visioning/index.html>.

mission to develop and apply cutting edge research to identify, understand, and address society's most pressing challenges.

Illinois is in a unique position to embrace learning through design at an unsurpassed scale. Design learning involves creativity, collaboration and communication, as well as connecting with people through observation and empathy, making it a sound basis for education, whatever field students may ultimately engage in.

The Design Center is a point of convergence where the campus community convenes, discusses, questions, thinks, gets inspired, dreams, conceptualizes, invents, creates, and innovates. The Design Center enables people to collaborate, immerses them in discovering, understanding and tackling meaningful challenges for which they design solutions, and connects them to a network of campus, community, and global resources. Embedded in this broader network, the Design Center is a beacon of Illinois' institutional commitment to education and discovery with societal purpose and relevance.

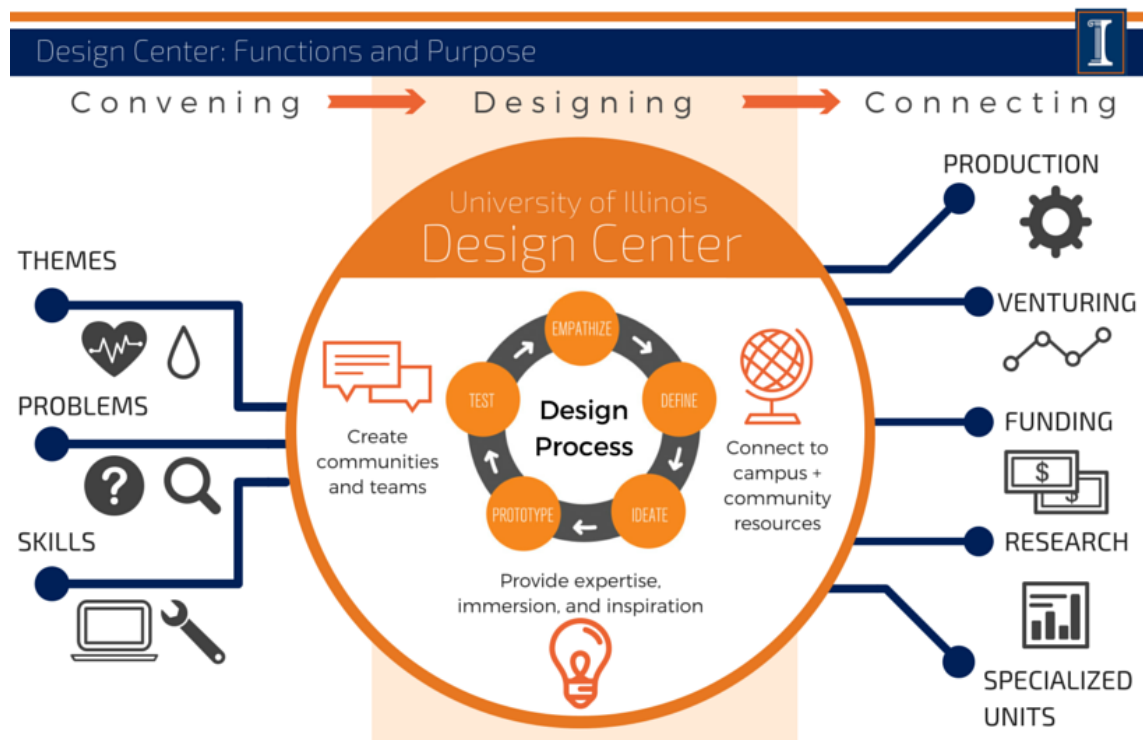
This mission sets the Design Center as a center node in the University-wide flow of people and ideas.

## ROLES ON CAMPUS

The Design Center plays *convening*, *designing* and *connecting* roles.

### Convening (+ Inspiration)

The Design Center *convenes* people by bringing them together as collaborators around themes, problems, or skills.



- **Themes** are broad topics or areas of inquiry and action. For example, energy storage or early childhood education. Specific problems within themes may be ill-defined or even undiscovered.
- **Problems** are specific, clearly-scoped and known issues with a need for solutions. For example, solar-compatible batteries for off-grid water purification or creating shared childcare systems for low-income workers. Understanding the importance of problem context in developing solutions is a key focus.
- **Skills** are capabilities or knowledge applicable to solving problems. For example, computer-aided design, ethnographic interviewing of users, welding, and simple and advanced prototyping.

Students, faculty, staff, and other stakeholders are drawn to the Design Center through any of these three convening factors. A freshman interested in energy storage with expertise in computer-aided design is inspired and supported alongside an MD/PhD candidate with expertise in prosthetic devices and a local leader working to decrease gun violence. Each individual will join—or form—a different community or team, but all will be supported by the Center in the designing+doing process.

Convening occurs in all space types. Convening around themes and problems is a primary function of meeting spaces, group areas, and immersion spaces, while convening around skills primarily occurs in the three types of space devoted to making and fabrication.

Convening is facilitated by hosted talks, workshops, seminars; curated video displays in many spaces; smart displays in entryway and common areas highlighting work at Illinois and ways to engage with active initiatives; SocialFuse and other networking events; virtual reality and other immersion experiences on offer.

### **Designing (+ Doing)**

The Design Center then facilitates the creation, via *designing+doing*, of meaningful products, services, organizations, and other ways of creating change. This includes non-physical creation, and will often focus on pressing social and environmental challenges.

- The Center provides **inspiration** based on the University's tradition of innovation.
- The Center's staff, faculty, and student workers supply a broad range of relevant, accessible **expertise**.
- These combine to help individuals form **purposeful communities and teams**—whether they initially entered based on a theme, problem, or skill.

Design Center project teams empathize with people by *immersing* themselves in users' experience, context, and milieu in person and via virtual and augmented reality. Project teams discover and define problems, ideate and prototype solutions, and test those solutions. Prototyping occurs not just within the Design Center proper, but also in other spaces around the campus and the globe.

### **Connecting**

The University of Illinois at Urbana-Champaign, taken as a whole, has tremendous capabilities that support ideation and design. A crucial function of the Design Center is to *connect* project teams to relevant resources in the broader campus and community network. This is immediately apparent in the “design complex” that will exist once the Design Center is built, including the fabrication spaces

in the adjacent School of Art and Design, the MakerLab in the Business Instructional Facility, the Illinois Digital Ecologies and Learning Laboratory (IDEALL) in the College of Education, and the collaborative learning spaces in Ikenberry Commons—the nearest nodes in a campus cyber-physical network that extends to multiple facilities and capabilities. Other nearby facilities include the FabLab in the Architecture Annex and the Caterpillar Student Sustainability Learning Center (under development by the Institute for Sustainability, Energy, and Environment) in the National Soybean Research Laboratory building. The latter will include space for experiential learning, an incubator and a communications laboratory. As new project learning, collaborative learning, prototyping and fabrication spaces are created to support department, school, college and institute-specific initiatives, they can be designed to take advantage of the full network and minimize duplication of facilities, support services and skills training.

The network concept provides awareness of and access to production, funding, research, and specialized expertise and assets across campus. Some programs physically extend into the broader community and world, with potential programs like a MakerTruck (mobile 3-D printing lab) to be housed in the Center, as well as global partnerships facilitated with telepresence and virtual reality facilities.

- **Production:** The overwhelming majority of local production capability is outside the Design Center. These include specialized machine shops, metals and materials fabrication, wet and dry labs, supercomputers, and many others.
- **Venturing:** Some Design Center concepts will be supported by the Entrepreneurship at Illinois ecosystem. This includes student-focused units like the Academy for Entrepreneurial Leadership, Technology Entrepreneurs Center, Social Innovation at Illinois, and iVenture Accelerator, as well as commercialization-focused units like EnterpriseWorks, Research Park, and the Office of Technology Management.
- **Funding:** The University has both direct funding streams (e.g., grant programs, EnterpriseWorks, IllinoisVENTURES) and specialized staff support in accessing funding (grant and contract specialists).
- **Research:** Many Design Center users will find themselves conducting original research in designing or proving their new creations. They will both benefit from access to research(ers) on campus and add to the collective research abilities of the University.
- **Specialized Units:** The University includes many units with very focused and specialized capabilities. For example, the National Soybean Research Laboratory, Children and Family Research Center, or National Center for Supercomputing Applications might eventually provide space or expertise to Design Center users—and form productive, pioneering partnerships with teams formed in the Design Center.

The Design Center will succeed or fail based on how successfully it draws people in, inspires and supports them, connects them with the next set of resources they require, and then provides an environment and scaffolding to sustain ideation and doing. The Design Center is not the final destination for creators, nor is it necessarily the starting point. The Design Center's role as the *center* of a campus-wide system catalyzes even more learning and creation at the university.

## PROGRAMS

A broad array of programs support the Design Center's mission and role in the campus cyber-physical network. The Design Center augments other nodes in the network in providing opportunities for learning, training and skill development, with access to state-of-the-art resources

and technologies. The Center does not supplant existing degree programs but rather is a resource to those programs.

An emphasis on a breadth of educational opportunities, ranging from the immediate—training modules, educational short courses, seminars, lectures and other downloadable, “streamable,” and remotely consumable materials; to more focused plans of study—technical certifications, flexible enrichment programs, hands-on training and courses leading to certificates; to the more in-depth—trans-disciplinary minor and dual-degree programs. The flexibility in this mix will enable the most passionate students to tailor their learning and degree programs to be most impactful.

### **Credit-bearing Courses**

The Design Center:

- Hosts a limited number of courses offered by various colleges. With very few exceptions (e.g., “An Introduction to Design Thinking”), the courses will be rotating and not permanently housed in the Design Center.
- Does not offer its own programs of study, but does work in support of trans-disciplinary minors and dual-degree programs.
- Incubates design-related courses that can then be embedded in their “homes” (colleges, schools, departments).

### **Skills Training and Certification**

The Design Center offers training modules, short courses, and certifications, in collaboration with colleges across the campus.

### **Team-focused Work**

Student teams working on projects will have access to the Design Center. Some of the teams will be associated with courses or workshops in various academic units; others will be formed through extracurricular or co-curricular initiatives; still others may be associated with student groups. No student groups will be permanently housed in the Center but it is possible some short and long-term student teams might have access to dedicated (and likely portable) storage.

Teams will benefit from the expertise of campus specialists, including advice in entrepreneurship, legal and intellectual property issues, and social challenges. Expertise from initiatives and organizations like EnterpriseWorks, the Office of Technology Management, IllinoisVENTURES, Social Innovation, the Technology Entrepreneur Center, and the Academy for Entrepreneurial Leadership will be accessible to Design Center users.

### **Speakers, Short Workshops, Campus Events**

The Design Center will invite speakers; organize and offer skill-, problem-, or theme-focused workshops (but not at a level to achieve any formal certification), and host campus events around design, innovation, making, service, and entrepreneurship.



### **On-demand Learning**

Lectures and other downloadable, “streamable,” and remotely consumable material, giving students access to resources that enable them to pursue problem finding, definition and solving and self-directed project ideas.

### **Community-focused Programs**

The Center may—in collaboration with colleges—support focused programming around community challenges, engaging community leaders and stakeholders.

### **Immersion and Virtual Reality Programs**

Although this a core element of the Design Center's value—and is therefore incorporated into many programs of the Center—some programs will focus specifically on these methods.

## **TYPES OF SPACES AND RELATED STAFFING NEEDS**

Meeting Illinois' vision for multi-disciplinary design-and-doing, with the new Design Center as the catalyst, requires nine types of spaces, several of which will overlap in execution and some of which may not be located in the Design Center proper. Each space type will host distinctive programs and activities and have concomitant staffing needs.

### **Convening and Inspiration Spaces**

- 1) Community-oriented and welcoming entry space with sources of inspiration based on Illinois' tradition of world-changing design; Illinois-specific display/gallery items built into the space in functional ways wherever possible (e.g., ILLIAC mainframes as tables, decommissioned MRIs as couches, use of LED/microchip/sound-on-film themes); art or exhibits around meeting spaces that identify key things that changed the world and were perhaps done by students (but not overloaded with UIUC propaganda).
- 2) Collaborative learning and ideation spaces (studios), divisible and re-configurable (space for post-it activities and information/idea gathering and exchange; whenever possible and desirable supplanted with state-of-the-art technologies that enable e-storage and retrieval of a team's notes, documents, designs, etc.).
- 3) Meeting/presentation spaces, including teleconferencing with omnidirectional (panoramic) streaming cameras so that anyone can join meetings remotely and "feel" like they are present for the brainstorming.

**Staffing:** Welcome desk staff, technicians, rotating “partial” staff from other units during their regular office hours.

### **Light Making Spaces**

- 4) Low resolution prototyping spaces (dispersed in studio spaces, paper, foamcore, assemblies with glue guns, light electronics and programming).

**Staffing:** Technicians.

### **Heavy Making Spaces**

- 5) Medium resolution prototyping spaces (wood, metal, plastics, light metals, consumer 3D printing, sewing machines, laser cutters, light materials).
- 6) High resolution prototyping spaces (metal CNC, machine tools, water jet cutter, pro 3D printing, metal cutting lasers).

**Staffing:** Technicians.

### **High Tech Digital / Immersive Spaces**

- 7) Virtual reality and physical immersion spaces for understanding problem and user context.
- 8) Digital imaging spaces (specialized computing, video production, print output, scanning, motion capture).

**Staffing:** Technicians.

### **Support and Storage Spaces**

- 9) Storage, checkout, staff workspace.

**Staffing:** Support staff, technician access.

## **BUILDING REQUIREMENTS**

Beginning with an assumption of 40,000 square feet of usable space in the Design Center, key questions are: how much space should be allocated to each of the space types articulated above; to what extent can other nodes in a design network supply the space types required to deliver on the promise of the Center?

The experience of the studio and fabrication shops of the School of Art and Design give a sense of scale of spaces required. The School's facilities related to design, prototyping and fabrication encompass 21,000 square feet and serve roughly 500 students (or 42 sf per student). Even if one assumes that students using the Design Center will not use space as intensively as the typical Art and Design major, it is clear that a 40,000 square foot Center will not be able to accommodate the full range of designing+doing facilities required to achieve its vision, particularly at a scale necessary to reach a significant number of undergraduates. In addition, existing fabrication facilities on the Engineering campus are not immediately proximate to the Center site; they may be operating at capacity given Engineering's size and growth; and they are not oriented towards open student access at present. This represents a significant challenge to the timely implementation of the Design Center initiative. Priorities for assigning the new building space would favor the leveraging of spaces not currently available or retrofitted to support the vision and mission of the Design Center, namely, convening users, inspiration, ideation, low-resolution prototyping, and immersion.

### **Solution: "Design Complex"**

A solution is to leverage the close proximity of student-focused facilities in the School of Art and Design, the College of Business, and the College of Education and, more broadly, to envision the combination of the Design Center, School of Art and Design Building, and Business Instructional Facility (BIF) as key initial parts of a promising "design complex" located centrally on an axis

running from the Engineering campus in the north to the Research Park, nearby the central Quad and core of Arts and Sciences instruction, and adjacent to the professionally-oriented programs in Business, Education, Fine and Applied Arts, Law, and Applied Health Sciences. The complex is also immediately adjacent to Ikenberry Commons, creating additional opportunities for multi-disciplinary living-learning programming and ready student accessibility.<sup>3</sup>

This complex could function as a student-accessible network immediately upon the Center's opening. Although neither the A+D Building or BIF/MakerLab could cope, in their current forms, with the increased demand from students drawn to opportunities and programming in the new Design Center, they may be able to serve as linked nodes immediately with relatively modest augmentation. Both sets of facilities share the advantage of compatible existing operating philosophies and infrastructures to manage student access and training. The Illinois MakerLab is open-access by design. Beginning this fall, School Art and Design facilities will be open to any student who pays a Workshop Access Fee of \$95 per semester.<sup>4</sup>

### **Rough Square Footage per Use Type**

Thinking of the problem this way, suggests the following:

- The Design Center provides mostly collaborative working and ideation spaces—coupled with low resolution prototyping—along with high resolution prototyping spaces for metal materials and some digital (most likely in a lower level or basement). An initial estimate of the high resolution spaces is 13,000 square feet of the estimated 40,000 square feet of usable space. That leaves considerable remaining square footage to accommodate ideation, entrepreneurship, instruction, immersion experiences, and other flexible uses.
- After modest remodeling, the School of Art and Design maker facilities would offer roughly 21,000 square feet of medium resolution prototyping and fabrication spaces plus some digital and 3D printing (and would be the location of wood, plastics, and other soft materials workshops).
- The Illinois MakerLab would offer additional 3D printing capacity.
- Both the Design Center and School of Art and Design Building would offer checkout of equipment.
- Some School of Art + Design metalworking equipment could be relocated from Flagg Hall into the Design Center to reduce costs and avoid duplication.
- The College of Education provides 4,800 square feet in four newly-refurbished spaces equipped with state-of-the-art technologies in addition to the Illinois Digital Ecologies and Learning Lab. These spaces are ideal for ideation and face-to-face and virtual/real presence collaboration, as well as for testing technology-rich designs for learning.

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<sup>3</sup> Approximately 3,500 students live within a five-minute walk of the Design Center site, with Ikenberry Commons and Dining Hall in particular providing a key set of spaces for interaction.

<sup>4</sup> The School of Art and Design's lab open access program is an experiment. The fee is low and internally subsidized; it will not be sustainable if take-up rates are high. However, even if the fee had to be increased, or some other means of subsidy found, the cost increase is likely to compare favorably with the cost structure of commercial models such as TechShop (which charges a *monthly* use fee in the range of \$150-\$200).

**Access and Training**

The Design Center, Art and Design maker facilities, and Illinois MakerLab should operate on a common training/skill/safety certification and equipment/space management system. Students would demonstrate proficiency in using given equipment and facilities and be granted access in multiple buildings accordingly. The School of Art and Design, which manages maker spaces extensively already and has developed systems to do so, could be tapped to manage the Design Center spaces on behalf of the broader network.

**Café Option**

There is further potential to take advantage of the Link Gallery which connects the Krannert Art Museum and School of Art and Design Building. An option is to consider the relocation of the café from the entrance of KAM into a remodeled Link Gallery. This would significantly expand the café but obviate the need for use of scarce Design Center space for this purpose. The timing of the Center project is good in that KAM is initiating major renovations of its entrance and galleries; there may be time to incorporate a Link Gallery renovation and café relation in those plans. Alternatively, the option could be exercised later by leaving the café out of the Design Center plans (given that cafés exist in both KAM and BIF).

**Expanding the Complex**

Eventually an expansion of the Art and Design Building, for which a feasibility study is currently underway, could accommodate additional space to facilitate the scaling up of the design initiative by providing additional maker space. It is unclear how soon funds for such a project could be raised but it is consistent with a project model that imagines phased expansion, provided the specific siting of the Design Center on the Military Axis and relative to Art and Design and BIF is considered in the Center building design process. Siting the Center building in a spatial arrangement that would facilitate considerable movement between the two facilities will be important to exercising this option. Likewise, the Center will exist adjacent to (eventually) an expanded Ikenberry Commons area and possible new building adjacent to Huff Hall. Envisioning the mix of the Center together with adjacent projects as contributing to a “design campus” within the larger campus would give Illinois a significant advantage over other competitors’ design collaborative learning spaces and initiatives.

Table 1 summarizes the possible distribution of spaces among facilities. Specific breakdowns would depend on the program envisioned for the Design Center.

<b>TABLE 1</b>				
	<b>Option 1</b>		<b>Option 2 (with Link Gallery)</b>	
<b>Facility</b>	<b>SF</b>	<b>Type/Function</b>	<b>SF</b>	<b>Type/Function</b>
Design Center	1,000	Atrium, gallery, materials library	1,000	Atrium, gallery, materials library
	1,000	Café and collaboration space		
	2,500	Flexible ideation and presentation space	2,500	Flexible ideation and presentation space

	15,000	Collaborative learning & working spaces, including low resolution prototyping	15,000	Collaborative learning & working spaces, including low resolution prototyping
	6,000	Meeting rooms, bookable spaces	6,000	Meeting rooms, bookable spaces
	TBD	Virtual reality/Immersion	TBD	Virtual reality/Immersion
	3,500	Metal prototyping and assembly	3,500	Metal prototyping and assembly
	3,500	CNC and pro 3DP	3,500	CNC and pro 3DP
	3,000	Digital imaging (CAD, Mo-cap, scan, video)	3,000	Digital imaging (CAD, Mo-cap, scan, video)
	3,000	Support staff spaces, checkout, storage	3,000	Support staff spaces, checkout, storage
	38,500	TOTAL	37,500	TOTAL
School of Art + Design Building	12,000	Wood, plastics and soft materials prototyping, fabrication, assembly and paint	12,000	Wood, plastics and soft materials prototyping, fabrication, assembly and paint
	5,000	Computers and 3D printing	5,000	Computers and 3D printing
	2,000	Digital imaging, photo and video production	2,000	Digital imaging, photo and video production
	2,000	Equipment checkout and support staff	2,000	Equipment checkout and support staff
	21,000	TOTAL	21,000	TOTAL
BIF	1,000	3D printing	1,000	3D printing
Education	4,800	Ideation, collaboration, prototype testing	4,800	Ideation, face-to-face and virtual/real presence collaboration, testing

				technology-rich design solutions
Link Gallery			2,000	Café and collaboration space
All	64,300		60,500	

The allocation enables Design Center students to have access to roughly 40,000 square feet of prototyping and making facilities in the Center and adjacent buildings combined. The link between designing and doing will be solidified by this approach, and convenient access to this range of possibilities will significantly enhance the work in the Design Center.

### **Indoor + Outdoor**

A key to a quality convening space is to design the building with a compelling visual and physical relationship to the outdoors, including the capture of “inspirational views” and inclusion of outdoor spaces for gathering, making, doing, and displaying. Effective use of patios, covered porches, windows, movable walls (to the outdoors), large doors, windbreaks, and skylights is essential.

More broadly, the aim is to envision possible building configurations beyond the typical “multifunctional box concept.” Parts of the Design Center program require closeness and darkness while parts demand light and exposure. Therefore, the building should be conceived as an open network/sequence of outdoor and indoor/exposed and introverted spaces, a design vision that aligns well with the concept of integration and networking while also opening avenues for linking the Center with existing or prospective adjacent buildings. The user perception of the building as it is approached from different angles and how it articulates and intersects with the existing site will be important facility design considerations.

## **LEADERSHIP AND STAFFING**

There is the need for dedicated leadership as well as programs that intentionally bring expertise and resources from across campus into the Design Center.

### **Leadership**

- Director: A faculty member with relevant experience and credentials and a proven ability to form connections and linkages across large, complicated institutions; some external and development focus is likely for this position.
- Executive Director: An academic professional focused on operations and maintaining intra-University links.
- A lean staff to support programming, event planning, and facility usage, including for reception, repair and maintenance of computers and machines, and media/AV support to document and share the work of the Design Center.

## **Governance**

- Top-level governance—and guidance for the Director—provided by a Board of Directors or by a campus-level committee.
- Advisory board(s) could bring expertise and connections from across the campus and community networks.
- Steering Groups for specific issue areas and topics, such as a Steering Group on Immersion and Virtual Reality (charged with ensuring the Design Center stays cutting-edge with relevant capabilities, making purchasing and budget recommendations, and seeking and creating opportunities to link campus and community efforts with relevant immersion/VR expertise and opportunities).

## **Technicians**

Technicians have three key roles: 1) supervising and supporting the safe use of Design Center tools and technology; 2) maintaining tools and technology; and 3) providing technical advice to all users of the Design Center. Trained students are likely to be a good source of technical support.

## **Other Personnel**

Other organizations across the campus can be tapped to offer “office hours” to provide expertise and access to resources (e.g., the Technology Entrepreneur Center, the Academy for Entrepreneurial Leadership, Social Innovation at Illinois, the Office of Technology Management, EnterpriseWorks, and IllinoisVENTURES). A high profile Fellows Program (including faculty and professionals in residence) could be developed with the expectation that Fellows will be present to work with users of the Center.

## APPENDIX A: IMMERSION SPACES DETAIL

Imagine a polluted traffic stop during peak hour in Beijing or Delhi...or a refugee settlement in Uganda....or an ice storm in Greenland. Now design a solution for that setting. Yes indeed, you wish you could be there. But what is the next best thing?

To design is “to plan and fashion the form and structure of an object, work of art, decorative scheme, etc.”<sup>5</sup> But the basis of this design has to come from deep understanding – of users, of communities, of contexts. Illinois will match the best schools in the world in design. But indeed, Illinois can set a standard in immersive design, in envisioning and creating virtual learning experiences that provide deep understanding of the problem and the context for which solutions and enterprises are being designed. Why? Because cutting edge technological innovation in virtual reality meets in-depth understanding of marketplaces and communities in the rich interdisciplinary tradition that is Illinois. Immersion in context is often the most difficult element of the design process – emphasizing the weakness in a purely technological approach.

Virtual immersion takes the designer *from sympathy to informed empathy* – enabling a connecting of the dots and an understanding of the details. It is, of course, not the same as being there. But it is an efficient way to learn about and sensitize ourselves to very unfamiliar settings. There are many methods – poverty simulations, multi-media based immersive exercises, day in the life videos, virtual reality.

Along with virtual immersion are tools that enable the user to write, draw, or vocalize insights and reactions. Virtual immersion can be used to develop understanding and in due course to generate ideas for solutions. Virtual immersion is also enabled by virtual interactions, interviews and observations, with field teams on the ground in different settings. And related to immersion is emersion, as we resurface after submerging in an entirely new context. Emersion tools would enable us to reflect on how our existing concepts from design, engineering, and business need to be stretched and reinvented in light of the radically different setting we experienced.

Our high tech digital immersive spaces would allow for design and delivery of immersive experiences tailored to different problems and settings. A few exemplars of immersive experiences in radically different contexts will be developed for illustrative purposes and supported by field teams on the ground with multi-media capability. Thus, a designer can experience a tribal area of East Africa virtually and also have the ability to interact virtually with the community and the local environment.

Individualized virtual reality devices will be designed to take multi-media content from a variety of sources and create 3-dimensional immersive experiences. This versatile feature will allow for just-in-time creation of customized immersion experiences. Theater level experiences will have similar capabilities. Both individualized and theater experiences will allow individuals and groups to observe, freeze, reflect, record, dwell, and ideate in the context.

Virtual immersion and emersion using the immersive space will also be part of curricular offerings to bring out the importance of understanding the problem, user, community, and context when designing for unfamiliar settings.

In summary, the immersive space will have many elements: individual virtual reality and theatre facilities; immersion and emersion tools for experimenting and recording; exemplars of

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<sup>5</sup> <http://dictionary.reference.com/browse/design>



immersion in specific settings; multi-media inventory matched with virtual reality technologies to create just-in-time immersive experiences; curricular experiences.

#### Specific Immersive VR Experiences

- Sitting, standing, or walking together in a planetarium room, with super acoustics and audio engineering. 3D could be supported, but glasses are cumbersome. 2D could be just fine.
- Sitting alone with a headset on. Need several stations for this. Some could have powerful PCs driving them; others could work by bringing in a laptop.
- Treadmills, bicycles, rickshaws, etc., space for simulated motion or transportation.
- A room for digital conference calling that could serve as (or be adjacent to a video production room in which students could record product pitches and in which instructors could tape video lectures.
- Walking alone or in a group in a huge holodeck space. If we supported redirected walking (need 30x30 meters for that), then nearly everyone on campus would be drooling. Redirected walking means that you fool your brain into thinking you are walking in straight lines, when actually you are walking in circles. This enables it to appear that you are comfortably exploring an "infinite" space, such as an entire city. An augmented reality experience, where information is simply added to your view while you walk around. A special space might not be needed for this, but some support hardware could be useful.

Spaces where people walk in VR must have some kind of motion capture capabilities. These were once expensive, like Vikon or Optitrac, but they are much cheaper now, like Valve Lighthouse. We might even want to dedicate a space to pure 3D motion capture of moving humans (dancers, performers, tour guides), without making the space double as a VR environment. In other words, it would be just a motion capture studio.

Make facilities so that it is easy to immersively connect with installations at "sister" centers around the world. This is sort of like Skype, but is a shared, interactive experience in a virtual space (which thus occupies space in our center and a center or centers somewhere else). This is sort of like the telephone booth of the future!

Assets are a huge problem in virtual spaces. Need some resources for that. Maybe the center can pay for access to a HUGE asset library.

For almost all things that need to be designed and built in the real world, there is a corresponding part in the virtual world. Students need to have software tools and be trained how to use them for designing 3D worlds. They also need to know when to just buy some assets, rather than build their own. Many people with design expertise could have advice that extends into VR: For example, how to do interior decorating in a virtual living room that is designed for people to interact from different cultures.