

The **Innovation, Research Learning and Collaboration** Committee (IRLCC) was established to survey CVPA's existing research, and technology facilities. Specifically, the IRLCC seeks to: a) identify technological needs of CVPA departments; b) address internal and external challenges; and c) begin to identify strategies in support intra-disciplinary collaboration, teaching, research and learning opportunities as mandated in the 2014 CVPA Strategic Plan. The committee is comprised of faculty, technicians and a librarian, and includes: Shingo Furukawa, (Technician) Kristi Oliver (Art Education), Allison J. Cywin (Visual Resource Center), Joy Miller (Design Technician), Marc St. Pierre (Fine Arts), Michael Swartz (Visual Design), Paula Medeiros Erenberg (Star Store Technician), Susan Hamlet (Metals) and Jing Wang (Music). The committee was convened by Dean Tio. This report reflects the views and recommendations of the members of the committee.

In today's interdisciplinary digital environment, visual and multimedia communication and creation are no longer restricted to a single area of study. Painters, sculptors, ceramists, fiber artists, jewelers, musicians, visual designers, art educators and art historians are using similar technologies to create content and fabricate work. With the adoption of STEAM/STEM pedagogical principles and a 21st century skills focus on project-based problem solving within K-12 education, we find technology and innovation at the forefront of this initiative. Many classrooms are equipped with multiple 3D printers, interactive whiteboards and projectors, high-resolution computers, projectors, scanners, and document cameras. Some schools have studios with green screens and TV/film/music production tools. Today, full integration of technology within K-12 schools is the norm for sharing, displaying and creating content in all subject areas. This generation of students expects to work within state-of-the-art technologies within a multidisciplinary environment.

The Committee looked at a number of Artist Hubs, Innovation Hubs, Innovation Zones and Makerspaces across the nation. Specific models we reviewed are: Media Lab at the Massachusetts Institute of Technology, VAC program at the University of Texas at Austin, Hunt Library at the University of North Carolina, Digital and Media Center at Sunny New Paltz and the Innovation Hub at the University of Oklahoma, to name a few. Typically, these hubs are defined *...as a space that connects students, teachers, researchers, and partners to nurtures ideas and projects in physical and virtual spaces*. Many are designed to support an assortment of arts programs, including: mobile sound proof rooms, green screen studios, 3D/4D studios, digital fabrication and printing, interactive video and sound projection, animation, gaming and video production, table and wall touchscreen technologies, presentation and work rooms, equipment service bureaus, and makerspaces. Innovation hubs are often located in centralized facilities while some are a series of coordinated zones under a single collaborative umbrella. The common thread among all these facilities is state-of-the-art equipment to be shared by all disciplines, along with dynamic and flexible cross-disciplinary curricular support program that fosters collaboration, research, innovation and entrepreneurship and a team manager who oversee multiple spaces and coordinates with staff and faculty programs and activities in support of curriculum and collaborative learning.

The Committee recognizes various challenges that often hinder CVPA from reaching this strategic goal. These areas include: internal and external academic pressures, lack of budgetary support, and a lack of coordination. Collaboration among department labs and the absence of an interdisciplinary plan to supports collaboration, research and innovation across all departments prevents CVPA from moving forward on many fronts.

CVPA is at a crossroads: pressures include declining enrollment in certain disciplines and increased competition from institutions such as other campuses in the UMass System, as well as Salem State University merging with

Montserrat College of Art, Lesley University's new Lunder Arts Center and Mass College of Art new design and media center. This new facility, schedule to open 2016, is designed to support collaboration and cross-disciplinary study among design, media and fine arts programs and includes critique space, lighting and sound studios, fabrication labs, laser cutters, modeling tools, space for collaboration ventures, product development laboratory, and spaces that support research and collaboration. Though CVPA has individual spaces that partially support these activities, some facilities are woefully ill-equipped in terms of current technologies and lack programmatic support. This became quite evident when the committee surveyed the equipment and facilities within CVPA (See Appendix A). Traditionally, CVPA facilities were established by departments resulting in nine silo labs at three different locations and in two different cities. The facilities include the following:

Engineering Building

- IDEASudio (Engineering building) that accommodates a 3D printing and green screen site

CVPA (Main Campus)

- Visual design lab/classroom that allows students to work and print
- Visual Resource Center for research, digital image and multimedia production and study lab (VRC)
- Music studio

Star Store

- Textile computer lab
- Printmaking Computer lab
- Computer lab

Each one of these facilities has evolved based on the needs of individual departments. This approach has inadvertently led to isolation, thus discouraging collaboration and innovation across disciplines. This structure needs to be reexamined and a comprehensive strategy needs to be employed if we are truly committed to the concept of collaboration and innovation as outlined in the Strategic Plan.

Budgetary restraints and structure has prevented the college from moving forward on many initiatives related to technology and collaboration. The College as a whole is asked to do more with less. With the current distribution of funds, many departments are forced to settle for what they can afford, rather than what is in the best interest of CVPA's students and faculty. With the administration's cuts in work study, staffing seven labs has become a real challenge, especially during after-hours. With this said, the CVPA community must find creative ways to share and collaborate with these limited resources, as well as to pursue external funds, which often require a cross-disciplinary approach to programming and a comprehensive plan.

The Committee acknowledges a number of proposals submitted by various departments that should be part of collaboration, research and innovation hub(s). Some of these initiatives are in place while others need immediate action in the coming year. But all should be part of comprehensive implementation plan towards a Collaborative, Research and Innovation Zone(s).

In 2013, CVPA embarked on collaborative venture with College of Engineering called the IDEASstudio. The studio is a digital/multimedia space consisting of multiple computers with CAD/Rhino programs, a 3D Scanner, a 3D printer, a laser engraver, and a full-length green screen wall for motion capture animation. Faculty and students are able to work on their 3D projects remotely and send their files directly to the 3D printers. Though the IDEASstudio addresses some of CVPA's needs for small scale 3D printing, it is not adequate for large scale digital fabrication. Another concern of the IDEASstudio is providing for the equipment and staffing long term.

Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM), among other applications, are narrowing the gap between the initial creative process and its ultimate products; streamlining the information flow between creativity, process, and product increases productivity and ultimately contributes to more innovative design and products. In the past few years, large scale digital fabrication spaces have become the norm in many visual arts programs. The process of digital fabrication is by no means expected to replace traditional practices – instead, it further enhances the current studio practices and understanding of materials for students and faculty.

With this in mind, CVPA has secured a \$9,000 grant to launch a Digi-Fab Lab space (in the Star Store basement floor) that supports digital fabrication. The monies will be used to set up a digital fabrication space and to purchase (2) Cube 3D printers, (1) resin 3D printer, and a laser cutter. In conjunction with this initiative, an instructor is needed for courses in the 2015 Fall semester. Other ideas suggested for the Digi-Fab-Lab is - interdisciplinary papermaking space and a small supply store (with a hard to acquire supplies such as photo-sensitive photographic plates, etc.) to serve both the lab and the Star Store students. Digi-Fab Lab will require a technician to oversee the equipment and support the curricular initiatives. It is unclear whether existing technical staff will be able to support this endeavor in the long term. Discussions and decisions regarding staff for user support and equipment maintenance should be addressed immediately.

Another program proposal is a centralized 2D color and monochrome (B&W) Printing Center for CVPA (serving Main campus and Star Store). Many CVPA students, as well as the entire student population, are without color printing capabilities. A dedicated print center would be a valuable resource for *all* students, regardless of major. Currently the printers are setup in a design classroom, making it difficult for staff to assist students without disturbing an entire class. At this point, the printers are available only to design students. There is however, limited printing available at the Visual Center (VRC) for the remaining CVPA students. The need for such a service is evident by the daily demands. By charging a fee for each print, the Printing Center will be self-supporting in terms of ink, toner, paper, professional servicing of printers and miscellaneous supplies. Fees can be managed through CITS, which has a card swipe machine set aside for CVPA sales, saving us what would otherwise include thousands in startup costs. Although this goes a long way toward meeting the printing needs of many students—and is an opportunity for all—printing on other materials, such as fabric, vellum and transparencies, is also needed at the CVPA main campus and Star Store.

CVPA also needs professional sound and visual production studios, as well as a service bureau for visual and audio equipment. These studios will provide students with the tools needed to work in animation, gaming, interactive and kinetic design, music composition and more. Though these studios would be primarily used by students of digital media and music, other disciplines within CVPA, such as sculpture, other fine arts and ceramics, would benefit from these facilities. In a world where technology allows anyone to create and produce

multimedia from their home, this would provide a platform in which true collaboration, innovation and entrepreneurship could occur.

For the past ten years, the Visual Resource Center (VRC) has expanded its mission to serve the entire college. It provides reference services, as well as instructional materials and services to meet the growing needs of CVPA faculty, TA's and students. Students from music, art history, art education, artisanry and fine arts departments use the Visual Resource Center to research, teach, study, and work collaboratively. The VRC serves as a distribution center for instructional equipment (computers, projects, speakers, video cameras and cameras), and provides images, multimedia content and resources in support of curriculum, visual literacy and research instruction. Through its collections and services, the VRC serves more than 3,000 visitors each year. With this said, however, VRC has out grown its current facility. The Visual Resource Center is in desperate need of a space that can accommodate faculty and students growing teaching and learning needs including group collaborative space (especially with the new University laptop requirement) and space for spontaneous learning were faculty or students can gain access to computer equipment, whiteboards and other technologies not available in studios and other spaces within CVPA. The VRC space should include flexible and portable equipment, furniture, computers, interactive whiteboards, and projection and touchscreens to support faculty and student activities. The digital production, equipment storage and office areas are extremely tight, making it more and more difficult to serve the CVPA community.

Additionally, the Committee discussed a list of possible programs that would support curriculum and enhance collaboration, research and innovation, including:

- Printing Center (for all materials)
- Group Work and Learning Space
- Sound/Projection/Sensory/Video Studio Spaces
- Critique Space
- Documentation and Matting Center
- Product Development Laboratory
- Media Capture and Transfer Space (VRC)

In conclusion, this report is just the starting point for this discussion and the Committee feels strongly that further input is needed from the members of the CVPA community. The Committee recommends a task force be appointed to develop a five-year action plan that establishes an innovation zone(s) for the main campus and Star Store. The task force should be charged to identify grant opportunities and community support to implement the plan. Currently there are a several funding avenues CVPA should pursue, especially through grants in the disciplines of music, art history, and art education. CVPA must entertain the idea of reconfiguring existing departmental silos and developing facilities that support the needs of all faculty and students. To begin the process, CVPA must find ways to reimagine the reuse of existing resources, identify and solicit internal and external financial support, as well as seek out any other opportunities that will move CVPA forward. CVPA must think outside the box, look for new opportunities, and instill an environment that encourages collaborative research and innovation across all disciplines, bringing together the entire CVPA community.

APPENDIX A**Type of Places**

- Quiet Places (laptop tables)
- Color Print Lab (paper, canvas, vellum)
- Group Work Spaces
- Group Classroom Project Spaces
- Multimedia Transfer Space
- Sound/Video Studio Space
- Collaborative Work Space
- Projection/Sensory Studio Space
- 3D Printing Space
- Critique Space
- Collaborative Research Space

Equipment Resources Needed

- 3D printers = Cube3
- 3D printers for applied arts
- Large scale color printers (paper, vellum, canvas)
- Sound Proof Station
- Image Scanner Station
- Video Transfer Stations
- Projecting Mapping
- Laser Mapping
- Audio Mapping
- Touch Screen Technology
- Holographic Projection
- Interactive Board Technology
- Arduino Boards (sensor based technology)
- Holographic Projectors
- Drawing Machine (Robotic)
- Interactive Projectors
- Whiteboard tables

Equipment Lending Program for Course Work

- iPads
- Digital Cameras
- Video Cameras
- Wearable Interactive Projectors
- Interactive Projectors
- Laptops/Computers

Reference:

Projection Mapping -

- <http://www.christiedigital.com/en-us/projection-mapping/Pages/default.aspx#downloads>
- <http://www.ncra.org/files/MCMS/5AE50867-A451-441A-94EC-658F2679E14E.pdf>
- Wearable Projection - walkabout <http://walkaboutprojection.co.uk/>

Audio-Responsive 3D Projection Mapping Demo - <https://www.youtube.com/watch?v=ua4WH4bqooI>

Video Mapping - http://videomapping.org/?page_id=42

Drawing Machines

- <http://www.thisiscolossal.com/tags/drawing-machines/>
- <http://www.wired.com/2011/05/the-drawing-machine/>
- <http://www.wired.com/2011/05/the-drawing-machine/>

Holographic

- 3D Demonstration -<https://www.youtube.com/watch?v=G10bztatpuFc>
- Holographic PowerPoint <https://www.youtube.com/watch?v=eLavoahAfv8>
- Holographic Movie <https://www.youtube.com/watch?v=QuANDlrTHyI>
- Laser Holographic <https://www.youtube.com/watch?v=FDK8bEU1s7M>
- Laser Stereolithography: <http://3dceram.com/en/category/3d-ceram/une-technologie-unique/>
- <http://www.cnet.com/news/microsofts-roomalive-turns-your-room-into-a-holodeck/>
- <http://www.microsoft.com/microsoft-hololens/en-us>

Touch Technology

- http://www.touchmagix.com/productenquiry/enquiry_page.php?gclid=CPC5pfy6pcQCFVckgQodxkYADA
- <https://www.youtube.com/watch?v=U-8NRaL5WzE>
- <http://lgdnewsroom.com/products-solutions/next-generation-display/4429>
- http://www.slideshare.net/deepika_n/touch-screen-sensor-14694814
- <http://ideum.com/touch-tables/>
- <http://www.nuisense.com/skinmultitouch.aspx?l=en-US>
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Interactive signage

<https://www.youtube.com/watch?v=VjF-kapcFsU>

<https://www.youtube.com/watch?v=1-ISVPu1M2k>

<https://www.youtube.com/watch?v=iQIDEPLHPyQ&list=PLEF9eeX5g8rBSodDXpzKxjil9BlzENVpz>

<https://www.youtube.com/watch?v=sbjOMualLVs&list=PLEF9eeX5g8rBSodDXpzKxjil9BlzENVpz&index=3>

projection museum exhibits drawing

<http://www.baanto.com/digital-signage-solutions-and-displays>

Interactive Board/Projector

- <http://www.epson.com/cgi-bin/Store/jsp/Landing/interactive-projectors-digital-whiteboard-comparison.do>
- <http://www.infocus.com/projectors/IN3916#overview>
- <http://www.ti.com/lstds/ti/dlp-technology/products/dlp-projectors/smartsource-3d-advantage.page>
- http://www.epson.com/cgi-bin/Store/Video-Library/video/Featured/BrightLink-Pro-1410Wi-Overview/2235612585001?BV_UseBVCookie=yes

Conference - <http://www.technologyreview.com/emtech/digital/15/>

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