

CAMPUS OF THE FUTURE 10/8 MEETING DISCUSSION SYNOPSIS

Questions

- How do we get out to the people to solicit their input and ideas?
- How can we better incorporate our work with university initiatives currently on-going or on the horizon that have a shorter-term vision so that we do not find ourselves in conflict with these shorter-range initiatives?
How can we find synergies with other projects on campus, such as ICAT's Mirror Worlds project, in thinking about what the infrastructure needs may be looking into the not-so-near future?
 - How can we identify these projects and initiatives?
- How will increasing numbers of students affect how faculty serve students? What does it mean for space concerns?

Applied Learning and Simulation Precincts

- Embracing “hands-on, minds-on” learning across the university
- Create spaces for students to apply learning and learn by experimentation/failure with a safety net
- How to use technology-enhanced learning to transmit knowledge in a “flipped classroom” setting

In the future, it is predicted that access to knowledge will be easy, and if we stay in the information transmission business, we will be out of business. With this in mind, there is a need to change the unidirectional information flow model since there is no longer the need to “buy” access to college in order to get access to information. This change will likely involve constructing learning environments that prioritize studio-type spaces over lecture halls.

Creating large-scale, studio-type spaces may involve having *simulation precincts*, work-like environments in which students have safety net to experiment, make mistakes, and learn from an iterative process. This learning may take place through multi-year, multidisciplinary projects, and space requirements will likely vary by type of project. Some types of projects, such as large-scale engineering and construction may need dedicated space while other studio spaces could be formed in more flexible spaces that are adaptable to different types of projects. A question that then emerges is “How do we renovate existing buildings to create these simulation environments and learning labs?” The ability to embrace the “hands-on, minds-on” learning model is important for all disciplines, not just those in STEM fields. The difference will be in what “hands-on” learning might look like for projects anchored in the humanities.

Two possible concerns raised in the group with this approach are the potential pitfalls of balancing professional training and education and how to ensure that students do acquire the needed knowledge that will then be applied. For the former, part of avoiding turning into a

technical institute focused solely on transferring technical skillsets involves remaining cognizant that applying knowledge and cultivating skills should incorporate “soft skills” such as critical thinking and creative problem-solving should be included in the educational experience. Additionally, making connections across the traditional disciplines will also go beyond technical skill acquisition. In terms of the latter, different mechanisms could be utilized to ensure that students have the correct knowledge base to apply and develop further. One approach could be with much closer linkages between Virginia Tech and K-12 systems to have core courses offered pre-college, perhaps even to the extent of creating a Virginia Tech-chartered high school. Another option would be stronger relationships with the Virginia Community College System (VCCS) so that students have the option to take courses elsewhere while still being affiliated with Virginia Tech. A third option might be to utilize technology-enhanced learning, such as ASU is doing with their Global Freshman Academy to deliver traditional lecture-style courses in a virtual space.

Time away from Blacksburg

- If not Blacksburg, where would students spend up to 25% of their time?
- How to build relationships with other institutions to have bilateral exchange of students?

As part of getting applied, real-world experience related to a student’s field of study, what would it mean if 15% or even 25% of time “at” Virginia Tech was not in a classroom on the Blacksburg campus? Where would students spend their time instead? A few suggestions offered included that the time could be spent in simulation precincts, study abroad, alternate campuses, internships or other options depending on what would benefit a particular student the most based on their interests and needs. For study abroad, there were questions asked about how we could build relationships with external organizations to have planned/dedicated spots for students as well as whether we would engage in bilateral exchange with these external organizations so that we bring equal numbers of exchange students to the Blacksburg campus as we send abroad.

One concern raised in the group about this notion of spending time away from the main campus was the impact that it could have on developing alumni loyalty.

Create Agile Spaces

- Consider augmented reality spaces such as ICAT’s Mirror Worlds
- How to create adaptable spaces with flexibility to meet different needs—e.g. Star Trek’s holodecks

The campus of the future needs to focus on being agile and flexible to adapt to changing learning space needs. An example given of the degree of flexibility desired was Star Trek’s holodecks where anything you need can be created with a simple request. Some participants suggested that we may have augmented reality classrooms as virtual reality technology could

have improved to the extent that we would have immersive telepresence capabilities. This would further facilitate and necessitate having buildings that can be reprogrammed with ease for different purposes.

Participants also noted the importance of creating spaces for community-based learning through social interaction and the experiences involved in college outside of the traditional classroom. This aligns with the idea of intentional “collision spaces” designed to facilitate the interactions between individuals that lead to novel ideas and underscores the value of mentoring and face-to-face interactions. A campus where students cannot hide or be marginalized is wanted. They noted that “campuses” are people + technology + physical infrastructure + community.

Becoming T-Shaped

- Give students more agency to make themselves “T-shaped” to develop both breadth and depth of knowledge and skills
- Majors designed around ideas and problems rather than courses

As with several of the other groups that met the same week, the topics of T-shaped learning and T-shaped individuals were discussed in this group. There was a sense that we should be increasing student agency to define what is meant by breadth and depth of expertise with the suggestion that majors could be designed around ideas and resources rather than courses. Someone noted that a major is just an artificial construct of what we define as depth of knowledge on a topic. Another individual suggested that perhaps some of the depth would be developed through what we think of now as graduate work

An obstacle identified for making it possible to make connections and break out of silos is the issue of disciplinary territories. Territorial departments were identified as obstacles for both creating agile spaces as schools and departments stake a claim on specific physical spaces and buildings on campus as well as obstacles for creating collaborative environments complex enough to deal with complex problems.

One concern mentioned is to come up with an alternative term to “fields of study” because fields of study seems like knowledge acquisition areas. There was some pushback on this in terms of understanding where master depths will reside. Where will the physicists be? Also, are there some fields, like medicine, that do not lend themselves to this more fluid approach?

Topics Suggested for Next Time

1. What is the current structure and approach of institutes at Virginia Tech? What does it mean if we challenge the notion of “college” or even “institute?” Institutes were a previous way of breaking out of the college/discipline structure, but many of the earlier institutes focused their efforts more on research than on education.

Current Virginia Tech Institutes:

Fralin Life Science Institute

Institute for Creativity, Arts, and Technology

Institute for Critical Technology and Applied Science

Virginia Bioinformatics Institute

Virginia Tech Carilion Research Institute

Virginia Tech Transportation Institute

More information: <http://www.research.vt.edu/institutes/>

2. What will Virginia Tech be doing operationally: teaching, research, administrative, etc.?
 - a. What will the university need to do those things?
 - b. Take an expansive view of what Virginia Tech will be doing

Future session: Drawing what the campus of the future may look like

October 22, 2015 Campus of the Future Working Group Meeting

Present: Kathryn Albright, Judy Alford, Timothy Baird, Jaime Camelio, Juan de la Rosa Diaz, Jaimie Edwards, James Harder, Meredith Hundley, Aki Ishida, Anne Khademian (remote), Benjamin Knapp, Rolf Mueller, Sanjay Raman (remote), Judy Ridinger, Frank Shushok, Jason Soileau, Ayesha Yousafzai

Not Present: Robert Broyden, Robert Sumichrast

Location: North End Center Room 2200

Initial Statements

- Discussion of why we'll talk about institutes next time
- This time: Fleshing out what the university will be—"What is the campus?"
- Topics from last time revisited
 - Learning spaces
 - Agile spaces
 - Flipped classrooms
 - Making sure that "campus" continues to mean more than just physical spaces

Factors that will influence the campus of the future

- What do we think the world is like?
 - e.g. transportation? Will everyone have cars?
- Demographics—human life expectancy gets big boost. Students might be preparing for 2nd or 3rd career. ID sectors that will influence campus
- Evolutionary development vs. transformation. How would we adapt to those things?
- Campuses aren't actually that different than they were 30 years ago? Academia hasn't reacted in terms of the physical plant
- Technology will continue to change exponentially. Major changes in the last 10 years. Troubling that we haven't solved distance education problem. Will we have solved this problem in the next 30 years? Will it be possible for us to be fully present in another location than where my body is? If technology can reach that point, that will cause major changes. Hard to ultimately have real relations remotely and fully. If we continue on a WebEx direction, will be very difficult. Technologies are currently failing to achieve face-to-face human-to-human interaction. People still want to get together even in the age of social media.
- Role of Sci-Fi in causing vision of the future. Danger in restricting our view of the future by what is possible in the present.
- Even if we tried to state factors in the future that will be different, we would just be speculating. We can't know...cautioning against trying to predict outcomes. We need a

process of thinking 30 years down the road that will be revisited regularly vs. thinking of outcomes.

- We cannot predict which 2 or 3 changes will be the most important. What is the safe bet of incremental change we can expect vs. there might be exponential change in another area. Even if there aren't more technological advancements, we can still be creative in how we use technology. Binary star conversation has mainly been about transportation and bussing people between campuses.
- Education of the future influencing campus of the future
 - Self-directed, problem-based learning. More flexibility—transdisciplinary.

Collaboration and Collaborative Spaces

- Space costs money. As an institution, must decide if collaborative spaces have value. How to justify?
- Collaborative space vs. 4 walls and a door
- Innovation spaces, collaboration spaces. Rent space as needed for more flexibility vs. sunk cost of building
- Collaboration with Newseum for blended courses? Variety of spaces for different purposes. Not all interview spaces or performance halls
- Need to anticipate changes and understand how people learn.
 - What is it about a campus? What kind of setting are we trying to create?
- Not all learning happens in collaborative spaces.
 - The need for quiet spaces.
- What do we want to accomplish vs. what do we want the spaces to look like?
- What do we mean by “the commons?”
 - Physical space and philosophical concept
 - Part of our discussion is what is the composite of our spaces?
 - How does it play in with learning and research?
- Innovation District—basic overview of what it is and what it does.
 - Collision areas—everyone is tightly clustered (both work and life) similar to university commons but on a larger scale. Interactions in an informal sense for enabling interactions. Coffee is required
- What does it mean if we have different types of students at different ages with different needs?
- How to maintain sense of community through human-human interactions?
- Where do people live?
- Campus is home where we build family. Technology can enhance relationships.
- We need heterogeneous spaces—homogeneous is not reconfigurable
- Use of maker spaces

- How can technology make us less dependent on geography? More remote locations?
 - Example of hospital system with decentralized spaces that still have hospital identity/brand.
- Need diversity of experiences and locations but still need a home location
- How to balance fragmentation and community

Scenarios

- Proposal of working through scenarios—pros/cons
- How do we think one standard deviation further than everyone else? How do we find the corrected path after the swing?
- How do we figure out what genetically hardwired features to being human and how we learn?

Inventory

- Create inventory of different kinds of interactions
 - What's needed to support those interactions?
 - What do we have and want to keep?
 - What's missing and we need to add?
- How to organize the inventory?
 - 3 prongs of university?
 - Learning Space Spectrums?
 - What are the constants? We will be human (What does that mean?).
 - Purposes of university?
- What kind of inventory?
 - Values (Ideals of community?)—Ut Prosim, hands-on minds-on, community, collaboration, heterogeneous spaces , ???
 - Spaces—how do spaces on campus encourage/discourage these values?
 - Interactions—what kinds of interactions nurture these ideals/themes?

Our Deliverable

- Conceptual idea of campus of the future?
- List of different options/components/modules that need to be included?
- What would the architect deliver? Feasibility study of various scenarios—if you want this, then you need to have done this. Possibly create inventories to then run scenarios through
- Process scenarios—suggested by the Provost? Suggest range of strategies to continue to think big into the future. Scenarios are too focused and give blinders. 30 years is too far out.
- Don't stop at inventories. Map inventory onto structure of university functions. Infrastructure in broad sense. What will we need to accomplish?

- We need to envision something somehow.
- Be really clear about what we're trying to accomplish (in big picture).

Other Discussions

- How to partner with alumni for projects?
 - Maintaining sense of community via alumni?
- Battlefield surgery?

November 12, 2015 Campus of the Future Working Group Meeting

Present: Kathryn Albright, Robert Broyden, Jaime Camelio, James Harder, Meredith Hundley, Katherine Keeney, Anne Khademian (remote), Benjamin Knapp, Gail McMillan, Rolf Mueller, Sanjay Raman, Judy Ridinger, Juan de la Rosa Diaz, Francis Shushok, Jason Soileau, Robert Sumichrast, Ayesha Yousafzai

Not Present: Timothy Baird, Aki Ishida

Place: Newman Library Multipurpose Room

Process:

This is an iterative process that will not end this semester. Others may join over time.

Topics:

Flexible/Agile Spaces

Technology makes spaces more flexible. However, we'll need to be very nuanced in the future to coordinate space and needs

Flexible spaces are inherently compromises because we do not have nor know the unlimited number of right specialized spaces

How can flexibility be built into specialized spaces? Don't just cater to the one-size-fits-all mean—need to maintain the ability to have specialized environments. An example would be the Quillen Auditorium as a lecture hall that has more flexibility with its swivel seats and power ports than a more traditional lecture halls

We should maintain options in terms of spatial choices for both students in their learning and professors in their teaching.

Create multi-disciplinary “neighborhoods” to coordinate collision zones—neighborhoods created within buildings. Human-human interaction is essential and must be at the center of these neighborhoods' creation. Need to have many spatial options for flexibility within neighborhood

Interactions of Curriculum and Spaces

How will a degree be designed? How will this impact how space/resources are allocated?

How does curriculum interact with space? This circles back to the self-designed education. Begin with what does the curriculum look like, not what the campus looks like.

Virginia Tech and the World

How can we effectively export the “VT Experience?”

Where will VT be in 2047? Will we be global? Extraterrestrial?

How does one effectively do an international presence?

Choices of building, partnering, or smaller scale activities

Temporary is cheaper and more flexible than building permanent

What do we want to be?

Develop presence internationally through project-based outreach/engagement

Caution: virtual presence = virtual results while real presence = real risks

Conversations regarding Deliverable:

- create an order to the guiding principles
- add characteristics of spaces
- How do we describe different types of spaces without limiting our discussion to the present? How do we include adapting the spaces we have now?
- What do we want the deliverable to look like/include?
 - High level vision
 - Packaging information
 - List a set of assumptions about the future then state the implications of those assumptions (opens possibility of discussing negative/undesirable future conditions)
- Crafting a vision on Google Docs (estimated 200 words?) that is based on inventories
- Discussion of how one member reorganized the infrastructure column by categories: physical places where interactions occur, technologies that connect/make space more effective, and utilities to support the other categories. There was a concern that this is a today-oriented viewpoint and technology may be inseparable from spaces in the future.
- People interpreted inventories in different ways. Another way people viewed them was: these are the types of interactions we want; these are the types of environments needed to cultivate those interactions; and this is the technology/utilities/infrastructure needed to achieve the environment to enable the interactions.
- Basic principle: Must Emphasize Human Interactions

Possible Assumptions to include:

- **Assumption:** Consolidation of higher education institutions
- **Assumption:** 30 years from now, rigor/quality will win
- **Assumption:** Technology will continue to evolve
- **Assumption:** Human interactions remain essential and must be emphasized

- **Assumption:** University will have finite resources (Implication: There will be compromises and trade-offs for any decision. Implication: Flexible spaces)

December 3, 2015 Campus of the Future Working Group Meeting

Participants: Kathryn Albright, Timothy Baird, Robert Broyden, Jaime Camelio, James Harder, Meredith Hundley, Aki Ishida, Katherine Keeney, Anne Khademian (remote), Benjamin Knapp, Gail McMillan, Rolf Mueller, Sanjay Raman (remote), Judy Ridinger, Juan de la Rosa Diaz, Francis Shushok, Jason Soileau

Not Present: Judy Alford, Robert Sumichrast, Ayesha Yousafzai

Location: Burruss Hall Room 201K

The group held the overall perspective that even though the product from the December 3 meeting would not be a final document, it needed to be ready to go forward as part of the Steering Committee Toolkit. Discussion began with a focus on the assumptions document shared with the group before the break and how the assumptions integrate into the larger document moving forward. The meeting focused on determining the factors and perspectives guiding the creation of our vision statement; university principles; design characteristics; and exemplars that embody these other factors.

Human to human interaction was highlighted as the primary goal of the campus of the future. In keeping with this goal, the group discussed what community members of the future university will be like, need, and how they will interact with each other and their environment. The environment of the future will be designed in such a way as to both enable and shape human to human interaction.

Overall, the conversations revolved around integrating topics covered in previous meetings over the course of the semester, including having flexible and agile spaces that can learn, improving technological infrastructure in order to improve connections between campuses and people, and creating spaces and opportunities for applied learning.

The meeting concluded with a brief discussion of next steps for the group, including preparing the tool for inclusion in the Steering Committee's toolkit the following day and plans to finalize the vision statement in a January meeting. The draft tool for inclusion in the Steering Committee Toolkit is included below.

Guiding our vision includes observational and aspirational perspectives on the future:

- 1) WHEREAS, some aspects of the university community and environment will stay quite the same while others will change dramatically. A variety of forms of physical infrastructure will accommodate these aspects of campus life in some cases and, in other cases, drive them.
 - a. Human to human interaction occurs along a spectrum of interactions including "productive collisions." The system will be designed to produce more productive collisions than unproductive. Interactions also occur between person and natural, physical, and virtual environments.

- b. The campus of the future is one that remains flexible in its approach to curriculum, infrastructure, and technology to promote individuality while encouraging community through multi-disciplinary, multi-generational, and multi-cultural engagement.
- 2) WHEREAS, to achieve this possible future, the university will need to be comprised of complex heterogeneous networks and innovation districts facilitated by technology. The university of the future will contain learning spaces, faculty offices, libraries, labs, residences, dining halls, recreation and wellness opportunities, connection to field experiences, and commons areas, among others.
- 3) The university must undertake iterative reflections on behaviors and how well its environment accommodates and adapts. Design by its nature is iterative. Looking at itself. Build an ecosystem. Some things dies and some things thrive. Value and acceptance of new ideas doesn't come immediately. Comes later.

University Principles

- 1) A land-grant legacy combined with 21st century opportunities. The university can translate research into finding the solutions to global problems
- 2) *Ut Prosim*—A prevailing sense of service
- 3) Hands-on, minds-on
- 4) Innovation
- 5) Binary star concept—tightly-coupled system of non-located campuses. Reflects our challenges of today. Right now, we are two major locations with Blacksburg and NCR, but we will find more binary stars and use those centers of mass to connect to others.
- 6) Maintaining both a global and a local presence and focus
- 7) Urban/rural footprints – Having a presence in both types of settings gives Virginia Tech a distinct advantage while also presenting challenges. Two settings which differ in many ways that create both challenges and opportunities to treat as a living laboratories
- 8) Building the T-shaped individual
- 9) Diversity and Inclusivity
- 10) Equity of access

Design Characteristics include spaces and places that allow:

- 1) Flexibility (change within fixed situations)
 - a. Continuum – spaces that foster collaboration (in person and technology) as well as spaces that allow quiet, focus, and privacy
- 2) Adaptability (change over time, new situations)
 - a. Autonomous systems and smart rooms that adapt to user (the Nest)
- 3) Creativity
- 4) Connectivity - Physical (inter- and intra-site/campus) and Virtual
- 5) People with a common set of interests together in a community; fusing intellectual life with co-curricular life that could encompass a whole community and not only students

6) Improved virtual presence for distributed campus/global environment

Exemplars

- a. *Spaces and places on current campus that are meeting our emerging vision, principles and design characteristics*

Living-learning communities—Co-curricular spaces allow students to interact with others who have shared interests in a concentrated form outside of the classroom.

Flipped classroom—For example, this semester’s “Introduction to Accounting” course offers students the flexibility to attend the class in person or to watch recorded lectures. Students have the flexibility to go back and forth between the two versions based on their current needs, and even the lecture format itself has shifted to not strictly be a one-to-many information flow.

Commons space - Pamplin commons

Alongside the need for collaborative spaces, we need to maintain contemplative spaces for individual reflection and discovery.

- b. *Spaces and places that have been proposed by other universities and organizations to meet nationally emerging vision of campuses of the future*

Discovery-focused international sites, such as Dr. Mueller’s lab in China, that are linked to main campuses by technology

T-shaped individuals created through customized learning and research opportunities.

- c. *Envisioning spaces and places of the future enabled by new technologies (“Star Trek”-like visions)*

Augmented-reality environments such as ICAT’s “Mirror Worlds” —a movement towards Star Trek-inspired holodecks as virtual labs

Exquisite remote telepresence to enable “live” collaboration among remote sites

“Simulation district” – Would allow students and researchers to experiment and learn to fail safely in controlled environments, both physical and virtual.

- d. *Movement; recreation and wellness--TBD*

Campus of the Future Working Group Meeting
February 9, 2016, 1:30 pm – 3:00 pm

Participants: Kathryn Albright, Timothy Baird, Robert Broyden, James Harder, Larry Hincker, Meredith Hundley, Aki Ishida, Katherine Keeney, Anne Khademian (remote), Benjamin Knapp, Rolf Mueller, Sanjay Raman, Judy Ridinger, Jason Soileau, Ayesha Yousafzai

Location: Biocomplexity Institute, Room 225

Kate shared information from the previous co-chairs meeting and that the Provost asks for work of thematic groups to wrap up by end of February. A final document using material from working groups will be crafted through the spring. A co-chairs meeting is scheduled for Tuesday, February 16 to share current group work. Sanjay mentioned the March 31 event in NCR—external constituents will be invited to give feedback on the Beyond Boundaries and Destination Areas proposals.

Innovation Hubs Sub-Group

Anne and Tim provided an overview of the work of the sub group titled **Innovation Hubs**. The timeframe and strategy would be to start now and in 30 years we would have gotten to an unknown place. Maintaining diversity in the university would be important. By design it would be experimental and one of many different types of spaces. Developmental and assessment key components. Important to determine what worked and what didn't work. Space would be thematically oriented and would be temporary, modular depending on the assessment of needs which would be continuous. Existing structures on campus and the contemporary college will coalesce in new ways. Innovation hubs are supplemental. We don't want to bury the discipline but allow for collaboration. ICAT is an example of something that is reflexive and iterative.

Comment that creativity and innovation districts are being looked at now by others. Is there an overlap of this and our process? Kathryn pointed out that innovation hubs include something that we know and something that we don't know. So this would be a mix of spaces and places.

Bob commented that currently the campus is in zones i.e. CRC, athletic complex, dorms, etc. What we don't have now is an area of campus with a mixture.

Anne pointed out that integration would be coming from different disciplines to the hub and there are all kinds of hubs. We can't predetermine that all hubs are "hubs." Don't want to get bogged down in physical design because that's part of the innovation. There isn't a specific model.

Global Experiment Station Sub-Group

Rolf and Aki presented work of the **Global Engagement Hub** (which seems a more appropriate description than experiment station.)

- 1) Would have global presence and engagement.
- 2) Would be on a range of timeframes – short to longer periods depending on the issue (few weeks to a few years) with designated rented space i.e. Global hubs are on a range of time scale and size scale.
- 3) Technology an important tool but also people need to be able to travel and make personal connections.

- 4) Information must be stored and easily accessed – with physical windows to see what’s going on in other areas.
- 5) To be successful globally, a global social support structure and mechanisms to raise local funds and get others involved would be needed (ex. global alumni to be involved in activities.)

The idea is not to dilute resources around the world and not replicate other systems. We would want to project VT out and project the world back to us. Innovation hubs could be modular and have mobilization teams. The alumni network would be important to our success. People are an extension of our campus.

Simulation Precinct Sub-Group

Ben shared the work of the **Simulation Precinct sub-group**. Precincts would reside within Innovation Hubs. It was suggested that Translational Engagement might be a better term because simulation precincts seems too narrow. This would be a place where students can try things and fail without causing a problem. Although we have some places like this now, they are only available to a few students. We would want all students to have access to these in the future.

Other comments included: institutes need to have a lifetime through assessment; things need to keep moving and not get stagnate; an era of big data (classrooms where you simulate an economy.)

Next Steps

These include creating a document for the co-chairs meeting and then creating a final product for the Steering Committee meeting on February 23.