Best Practices - Shared Resources

Shared Resource Definition

A shared resource (often referred to as a core) in a university context typically refers to a centralized facility or entity that provides access to specialized instruments, technologies, services, data and/or expertise. These resources may be shared among multiple research groups, departments, schools, or even institutions, allowing for more efficient use of expensive or specialized resources. Examples of shared resources might include a laboratory with advanced microscopy equipment, a computing cluster for high-performance computing tasks, or a center offering specialized analytical services. The advantages offered by such a facility can include, but are not limited to: (a) enhancement of research capabilities of the university and its collaborators by providing access to high-quality resources that might otherwise be too costly or complex for individual researchers or groups to obtain and/or maintain on their own, (b) increased safety (c) avoiding the duplication of resources, (d) wider visibility and hence increased usage of the resources, (e) enhanced university reputation, (g) controlled research rigor and reliability, (h) focal point for relevant educational activities, (i) recruitment and retention of faculty and staff.

Key Drivers for Establishing and Maintaining an Academic Shared Resource

1. A careful and methodical approach is critical for the successful establishment of an academic shared facility or resource, including a plan to maintain the core's operations and relevance. The establishment of a new core should include the development of a core facility vision and mission along with a viable financial business model that includes (a) the need for space, (b) specific HVAC requirements, (c) initial capital investment (e.*g., equipment and infrastructure*), (d) any startup subsidies (*successful 'steady state' core operations typically require considerable time to ramp up*), (e) any needed plan and agreement among faculty to consolidate existing PI resources, and (f) any long-term support (for example, a percentage of the operating budget). The resulting facility vision and business model should include estimates of a minimum number of users as well as sustained department, school and/or university support. In some cases, an approach for launching a new facility could be based on formalizing an existing ad hoc sharing of resources. Such a transformation should include the above considerations but with particular attention to untangling and replacing existing individual ownership and control with a structure compatible with core best practices (see below).

Elements to consider:

1 Demand for Specialized Resources: A rationale for establishing a core can include the need for access to specialized equipment, technologies, or expertise that are too

expensive or complex for individual labs and in some occasions departments to create and maintain on their own.

2   Efficiency and Funding: Shared resources should give rise to a more efficient use of funding, space and expertise by pooling resources. High quality cores should suffice to discourage the development or support of redundant entities.

3   Service, Maintenance and Safety: Shared resources allow for improved 'customer' service (which can include facility management software, training, technical advice, data management, and stocking of supplies), maintenance (i.e., cores are often in a better position to afford facility technicians, equipment repair and service contracts) and increased safety oversight and compliance.

4   Interdisciplinary Collaboration: Core facilities often serve as hubs for interdisciplinary research, fostering collaboration across different fields, departments, schools and beyond.

5   Enhanced Research Quality and Capacity: The advantages of a core may include access to high-end equipment, specialized expertise and service can significantly improve the quality and scope of research outcomes.

6   Educational and Training Opportunities: Shared resources often provide training and educational opportunities for students and researchers, helping to develop a skilled and informed workforce.

7   Institutional Strategy and Prestige: Establishing core facilities can be part of an institution's strategy to enhance its research capabilities and reputation in the scientific community.

8   Compliance with Funding Agency Mandates: Some funding agencies encourage or require the creation of shared resources to maximize the impact and accessibility of funded research.

9   Technological Advancements: The rapid advancement of technology in various fields necessitates continual updates in equipment and expertise, which is more likely to occur and more feasible through a shared resource.

10 Grant and Funding Opportunities: Cores can be viewed positively by proposal reviewers with respect to research outcomes and leveraging of funding. Certain grants may also specifically target the development or enhancement of shared resources, providing a financial incentive for their establishment.

By following these best practices, the university can maximize its research quality through the effectiveness and impact with the creation and/or adaptation of new shared resources

Example evaluative questions

A. Are services of the core aligned with the mission of the main entities that will support it?

B. What investment (funds, space, faculty hires, facility staff) will be required to create this core and how long is the facility projected to remain relevant, given the initial launch?

C. What continued institutional support (beyond core service recovery fees) will be required to maintain this core, what is the marketing plan to promote the core, and what are the operational and business plans to guide the facility's management?

D. Which (list names and affiliations) faculty plan to engage with the proposed facility, how many of their students and staff will use the facility (how much, including fee projections if applicable).

E. What will strongly attract users from their own PI labs/resources to substantially utilize the core, write new proposals leveraging the core and are faculty in agreement to pool any of their existing "PI" resources?

F. Is there sponsored research currently existing at UVA in the research areas that this Core will support, what new collaborations and funding opportunities exist and what types of new technological advances may ultimately result from the creation of this core?

G. Do similar core facilities exist at other recognized, high quality research universities and are there features of the proposed core which will distinguish UVA?

Best Practices for Shared Resources

Best practices for managing a university shared resource encompass a variety of aspects including administration, usage, funding, and maintenance. Key practices include:

1. Core Safety: Safety of core personnel, facilities, equipment, instrumentation, and operating practices is a critical core management responsibility. Standard operating practices and safety documentation must be established for the core, with collaboration with the appropriate university safety groups (such as Environmental Health and Safety). Require safety training as needed before allowing user access to facilities and resources. With UVA approval, this can include the use of video camera monitoring when warranted.

2. Clear Management Structure: Establish a transparent management structure with defined roles and responsibilities. This ensures effective oversight and decision-making.

3. Funding and Financial Management: Establish a sustainable funding model/business plan, which could include user fees, institutional support, endowment and grants. Transparent financial management is crucial.

4. User fees: User fees (including entrance, $/hr facility or instrument, training, service and supply) are often used to support facility operations. All fee rates must be approved by the office of the UVA Comptroller. A given usage fee rate can vary with respect to internal (UVA) versus external users but must be applied uniformly to all internal users. Fee and facility management can include the use of an online facility management software system.

5. User Training and Certification: Provide thorough resource, operational and safety training for all users to ensure they can use all equipment and facilities safely and

efficiently. Require users to pass applicable university-offered safety and training modules and implement a certification process as needed.

6. Fair Access, Scheduling and Support: Develop a fair and transparent system for scheduling and resource allocation. This can include an online booking system or facility management software to manage usage.

7. Regular Maintenance and Upgrades: Maintain the equipment regularly to ensure it is functioning optimally. Plan for periodic upgrades to keep the technology current. Plan for changes to equipment capabilities to keep the core relevant.

8. Quality Control and Compliance: Implement quality control procedures to ensure reliable results. Ensure compliance with relevant safety and ethical standards.

9. Collaboration and Outreach: Encourage collaborations both within and outside the university. Outreach to potential new users can increase the utility and impact of the core facility.

10. User Feedback and Continuous Improvement: Regularly collect user feedback and use it to improve the services offered by the core facility.

11. Data Management and Security: Implement robust data management practices, ensuring data integrity and security, especially if sensitive or proprietary information is involved.

12. Reporting and Evaluation: Regularly report on the facility's usage, impact, and financial status to stakeholders. Periodic evaluation of the facility's performance can help guide improvements.

13. Cores should play a significant role in education and in faculty recruitment and retention.

By following these best practices, the university can maximize the effectiveness and sustainability of its shared resources or core facilities, thereby enhancing the overall research output and collaboration opportunities.

Example evaluative questions

A. Use the above as a checklist to evaluate the best practices of the core.

Sustaining Shared Resources

Sustaining an academic shared resource or core facility can involve several key elements including:

1. Robust Financial Model: Establish a sustainable funding model, which may include user fees, institutional support, grants, and external funding. It's essential to balance affordability for users with the cost of maintaining state-of-the-art resources and skilled staff. University support of cores can include personnel costs, a percentage of the core's operating expenses, fundraising efforts, endowments, and equipment procurement (for example, through the Equipment Trust Fund (ETF)). Additionally, actively recruiting faculty members whose research aligns with the core's

capabilities, and adjusting the core's focus to meet evolving research needs are critical for sustained operation.

2. Effective Management and Governance: Implement strong leadership and clear governance structures with oversight, including policies for usage, prioritization, and conflict resolution. The management structure should ideally include a faculty director to serve as a liaison with the faculty and a facility manager. Additional staffing may be required to address fiscal administration, engineers and/or technicians to ensure efficient operation, instrument maintenance etc.

3. High-Quality Services and Equipment: Prioritize the continuous update and maintenance of equipment, alongside offering high-quality, reliable services to ensure repeat usage and a positive reputation within the research community.

4. Skilled and Trained Staff: Employ skilled personnel who are experts in their respective fields and provide them with ongoing training and professional development opportunities to keep pace with technological advancements and evolving research methodologies.

5. User Training and Support: Offer comprehensive training and support to users to ensure safe, efficient, and effective use of the facilities leading to user satisfaction and repeat usage.

6. Marketing and Outreach: Actively market the core facility's services to potential users both within and outside the institution to increase usage and revenue. Marketing could involve leveraging digital platforms, giving presentations at faculty meetings, providing tours for prospective faculty and corporate users, attending and presenting at relevant conferences, and engaging in networking activities.

7. Regular Assessment and Adaptation: Conduct periodic assessments of the user base's needs and adapt services, equipment, and expertise accordingly. Ensures the core facility remains responsive to the research community's evolving requirements.

8. Diversified User Base: Encourage a broad and diversified user base, including researchers from various departments, other institutions, and industry.

9. Compliance and Safety Standards: Ensure strict adherence to all relevant safety and compliance standards. Provide regular training to all users and staff to maintain a safe working environment and ensure uninterrupted operations.

10. Strategic Planning and Evaluation: Engage in regular strategic planning and evaluation to align the core facility's goals with the evolving needs of the research community and technological advancements. This strategic foresight helps ensure the facility remains relevant, financially viable, and continues to provide high-quality services.

By incorporating these elements into its sustainability plan, an academic shared resource or core facility can enhance its long-term viability and success, contributing significantly to the university research community it serves.

Example evaluative questions

A. Should issues regarding core sustainability (such as client services/satisfaction, budgetary or personnel, instrumentation/equipment etc.) become a concern use the above as a checklist to evaluate the sustainability potential of the core may be of value.

<u>**Shared Resource Evolution**</u>
The evolution of an academic shared core is crucial for its continued relevance and effectiveness. Key elements for this evolution can include:

1. Regular Technology Updates: Stay abreast of and invest in the latest technologies and equipment to keep the facility current and competitive.
2. Adaptation to Emerging Research Needs: Continuously assess, and adapt to, the changing needs of the research community to ensure that the services offered remain relevant and in demand.
3. Strategic Planning: Engage in regular strategic planning sessions to set goals, identify areas for growth, and address potential challenges.
4. Diversification of Services: Expand the range of services and expertise to attract a broader user base and meet a wider array of research needs.
5. Staff Development and Expertise: Invest in ongoing professional development of staff to maintain a high level of expertise and introduction new skills and knowledge.
6. User Feedback and Engagement: Regularly solicit and incorporate feedback from users to improve services and align with user expectations and requirements.
7. Collaboration and Partnerships: Form partnerships with other institutions, industry, or international collaborators that can generate new opportunities and resources.
8. Financial Sustainability: Adopt a financial model that supports growth and adaptation, changes in response to patterns of use, and includes both regular and strategic exploration of new funding sources and models.
9. Marketing and Visibility: Maintain an awareness of university initiatives and research areas of focus, faculty development programs and changing research needs to promote the visibility and reputation of the facility through effective marketing, publications, and outreach activities.
10. Compliance and Accreditation: Be proactive in understanding and adopting industry and institutional changes in regulatory compliance standards and accreditation.
11. Operational Efficiency: Continually improve operational processes to increase efficiency, reduce waste, and optimize resource usage.

By focusing on these elements, an academic shared resource can evolve to meet the changing landscape of research and maintain its value and effectiveness to the academic community.

Example evaluative questions

A. Provide concrete examples of how the core has followed its plan to stay abreast of technological updates, adapt to changing research trends and user needs and, upgrade resources and services. Does this plan need to be adjusted or expanded?
B. How do you plan to update and improve the core's goals and strategic plan to maintain relevance, efficiency, and financial viability?
C. How are you maintaining and improving staff expertise, development, and efficiency?
D. How are you soliciting and incorporating feedback from staff and users, new best practices, partnerships to expand the core's use, and fresh marketing for increased visibility?
E. Has the core maintained safety expectations, regulatory compliance, and accreditation? If not, list the deficiencies, the corrective measures taken and how the core's best practices have been improved to avoid future deficiencies.

Shared Resource Sunsetting
Sunsetting a core facility can be driven by several defining features:

1. Obsolescence of Technology or Services: As technology rapidly evolves, equipment and services may become outdated and hence less relevant or useful.
2. Declining Demand/Availability of Alternatives: A significant reduction in user demand, often due to shifts in research focus or availability of newer, and/or more advanced resources which can be addressed more efficiently with outsourcing may lead to reduced core use.
3. Financial Unsustainability: If the facility is consistently unable to meet its expected fiscal goal, the financial model of fees and/or support may need to be revised. Withstanding that consideration should be given that the core may no longer be financially sustainable.
4. Changes in Impact: A significant reduction in impact (including grants that leverage the shared facility, attracting new faculty and scientists, and associated university 'income' not directly connected to the shared resource's operating account) can impact the value of the shared resource. Observed decline in publications and grant proposals support by the core are additional metrics to consider.
5. Changes in Institutional Priorities: Shifts in an institution's strategic research direction can lead to a consolidation or reallocation of resources away from certain facilities.

6. Difficulty in Maintaining Expertise: Challenges in retaining or recruiting skilled personnel to operate and manage the facility effectively can lead to reduced core impact and use.
7. Regulatory or Compliance: Inability to meet evolving regulatory, safety, or compliance standards.
8. Educational Mission: No longer supporting the educational mission of the institution may significantly impact utility of the core.
9. Infrastructure Challenges: Physical space or infrastructure constraints (including age) that limit the facility's operation or expansion.
10. User Assessment: Poor end user satisfaction scores and assessments (administered and tracked over time) can be an indication of a sub-optimal operations, misaligned core mission, and/or a core that is insufficiently supported.

The decision to sunset a shared resource is often complex and involves weighing the facility's benefits against these and other institutional specific factors.

Example evaluative questions

A. Is the technology sufficiently cutting edge and aligned with the needs of the university? If not, can the facility adapt accordingly and at what expense and resources?
B. Does the shared resource meet the expectations of the financial model (including downstream impact and revenue generation)? If not, can adjustments be made (including fees and institutional support) to realize functional finances while still maintaining an attractive resource and institutional support?
C. Are there more attractive, competing shared resources available or does outsource seem a reasonable option? If the competing resources are at UVA, does it make sense to combine the resources or to re-align the resources in order to avoid duplication?
D. Does the core still fit the mission of the university/school/department?
E. Is effective and professional service provided to users? If not, can this be rectified with improvements in staffing, training and management?

University-Level Support and Coordination
The ecosystem of shared resources at the university benefits from direct and easy access to high-level information about each core and with university-level coordination of the cores.

1. The university-level, shared-resource website should provide a "one-stop" collection of shared-resource information, and promote and highlight the resources.

2. The centralized collection of strategically organized and presented, high level shared-resource information is not limited to, but should include: (a) basic information about and capabilities/offerings of the shared resource (including specific instruments/resources as relevant), (b) what community(s) does the resource serve, (c) yearly reports from each shared-resource, (d) how the resource is supported (including specifics about direct university support and fees), and (e) website links to and contact information for each shared-resource. Information should be limited to internal access as appropriate.
3. The benefits derived of such a collection of shared-resource information are both internal and external, and include (a) convenient internal access to and normalization of how the community of shared resources are managed, evaluated, and supported, (b) efficient searchability of the shared-resource capabilities/offerings (for both internal and external based searches), and (c) broadened visibility to and engagement with the greater public beyond UVA (other university, foundation, and industrial collaborators)
4. In partnership with the shared resource directors, university-level unifying policies and practices are needed around staffing, cost structure, governance, accessibility, and future central resourcing/investing.
5. University-level coordination and strategy is needed to support the identification, assessment and planning of new opportunities as well as the potential synergistic engagements between and/or combination of existing resources.