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Research Information Management: How the Library Can Contribute to the Campus

Conversation

Annette Day

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Abstract

This article describes a project undertaken as part of a cross-campus strategic planning effort.

The project documented current campus practices and systems in use for collecting, analyzing

and reporting key research metrics. The project identified organizational issues around siloed

data collection and lack of clarity on data stewards, data stakeholders and data reporting

schedules. The work highlighted to University Administration the need and importance of

effective research information management (RIM), and the key role that the University

Libraries can play in this area.

This article describes a project that can be replicated at other institutions and the results

utilized as an entry point to campus-wide conversations on RIM.

Introduction

This article will describe a project undertaken as part of a cross-campus strategic planning

effort, the Top Tier Initiative at the University of Nevada, Las Vegas (UNLV). The project

documented current campus practices and systems in use for collecting, analyzing and reporting key research metrics. The project identified organizational issues around siloed data collection and lack of clarity on data stewards, data stakeholders and data reporting schedules. The work highlighted to University Administration the need and importance of effective research information management (RIM), and the key role that the University Libraries can play in this area.

This article describes a project that can be replicated at other institutions and the results utilized as an entry point to campus-wide conversations on RIM.

Literature Review

Dempsey defines RIM as “the integrated management of information about the research life-cycle and about the entities which are party to it” (2014, para. 3). Effective RIM should allow an organization to achieve the full array of life-cycle needs, moving from the identification of funding, through reporting and benchmarking of research outputs, to high level strategic planning. (Imperial College London, & Elsevier, 2010, p.7-9).

There are various stakeholders in the university involved with research information. Rumsey divided them into three categories grouped by function. “Researchers: those who actively define and undertake research. Administrative staff: those who manage research activities at

different levels. Strategists and disseminators: those who work at the university level and who are not directly involved with research activities.” (2010, p.175)

Rumsey also noted that there are stakeholders and motivations external to the university. Funding agencies require evidence of the activities, outputs and outcomes of the research they funded. Additionally institutions use research activity data to articulate the caliber of their research to attract high quality staff and students (2010, p.175).

Research information is usually distributed across systems in the organization, with different systems overseen and managed by the different stakeholders. Scholze and Maier (2012) described their experience at Karlsruhe Institute. They found that information was “held in numerous systems run by different organizational units using different formats and data models.” (2012, p.206). JISC (n.d.,para. 3) echoes this issue, “Research information is often scattered across systems: human resources; student records; grant management; publications databases; repositories and web pages”.

Kane (2016, para. 9) reports that “when looking at the core research administrative processes, the key word is *integration*”. Kane goes on to describe the evolving marketplace for Current Research Information Systems (CRIS). These systems facilitate the needed integration by “uniting information from the different institutional systems under a common interface” (2016, para. 9). Dempsey uses the alternative term Research Information Management System (RIMS)

to describe the same concept and states that a RIMS will effectively integrate a variety of internal and external systems. (2014 para, 5).

Givens (2016) notes that RIMS/CRIS utilize data from authoritative sources and metric tools, enabling an organization to have confidence in the data ingested into their system. Givens also highlights how RIMS/CRIS use standards and common data formats for interoperability, enabling the import of external data and reuse of system data in other tools. Mornati (2014) agrees stating “A robust, persistent, discoverable, reusable record in a Research Information Management System requires an e-infrastructure made by interoperability standards” (2014, slide 19). Kane provides a focus on the Open Researcher and Contributor ID (ORCID) standard. ORCID is a persistent author identifier and is a standard that provides a “host of benefits around efficient reuse of data” and emphasizes that all major RIMS/CRIS support data push and pull from ORCID (2016, para.10).

Brand (2016) identifies that the implementation of RIMS/CRIS at universities is slow even though the issues of data silos and the need for interoperability are generally recognized and understood. Brand believes it is the lack of organizational wide ownership of the challenge of integration that is hampering adoption of RIMS/CRIS. “No one seems to “own” interoperability or have the authority to insist that a system serving one academic department or administrative unit be designed to exchange data with systems controlled by other administrative entities” (2016, para. 6). Givens (2016) also provides some theories for why the adoption is slow, ranging from organizational and political roadblocks such as resistance from

faculty, through to the sheer size of the task of populating a RIMS/CRIS. “Outside of grants and publications, much of the information an institution may want to capture about their faculty does not have a source and requires manual entry” (2016, para. 11).

Brand (2016), Enright (2015) and Dempsey (2014) all see the evolving development and growing implementation of RIMS/CRIS as a key opportunity for libraries. Brand (2016, para. 9) believes that the library has an established role as the steward of the institution’s scholarship and so the library is at the core of research information management. Givens (2016, para. 12) agrees and encourages the library to adopt a leadership and advocacy role in the organizational discussion around RIM.

UNLV Top Tier Initiative Background and Overview

UNLV is undertaking a large cross-organizational strategic planning effort called the Top Tier Initiative. The stated vision of this initiative is for UNLV to be recognized as a Top Tier public university in research, education and community impact by 2025 with an R1, Highest Research Activity Carnegie Classification.

The initiative began in 2014 with a broad cross section of faculty, staff, students, alumni and community leaders being appointed to an Initiative Committee by the University President. Those appointed to the committee were assigned for their skills and expertise, and identified through their work on existing campus committees, campus positions held, or named by their Dean as representatives for a specific area. UNLV Libraries’ faculty and staff have well

established relationships across campus through committee service and effective outreach. This deep integration into campus meant that the skills of UNLV Libraries' staff was well understood and this ensured librarians were invited to participate on the Initiative Committee.

The first phase of work was to identify how UNLV could achieve Top Tier and to understand what Top Tier would look like at UNLV. To do this, eight subcommittees were created with each of those subcommittees focused on a key area critical to UNLV's path to Top Tier. Those focus areas are listed below.

- Community Engagement and Resources
- Data Projection and Analysis
- Diversity
- Economic Development and Innovation
- Internal Functioning and Infrastructure
- Research and Faculty Achievement
- Shared Governance and Faculty Productivity
- Student Achievement

Each subcommittee was charged with drafting a Top Tier vision for their area, complete with goals and measurable indicators of success, so that progress could be evaluated. The Initiative Committee worked under the direction of an Executive Committee. This executive group utilized the work of the subcommittees to develop an overall strategic plan for Top Tier. In May 2015, this plan (University of Nevada, Las Vegas, 2015) was released, articulating a vision,

mission and goals for Top Tier. Five “pathway goals” to Top Tier were identified, narrowing down from the original eight subcommittees. Each pathway goal was described with action items and key measures of success, so that progress to each pathway goal could be measured.

The five pathway goals are:

- Research, Scholarship and Creative Activity
- Student Achievement
- Academic Health Center
- Community Partnerships
- Infrastructure and Shared Governance

With the release of the strategic plan in 2015, the second phase of work began. Members of the Initiative Committee were assigned to a pathway goal area and work is ongoing through various charged subcommittees to achieve the action items and success measures articulated, with the aim of achieving Top Tier by 2025. The Libraries has representation in every pathway goal area.

Research, Scholarship and Creative Activity Pathway Goal

The focus of this article is on the work of one subcommittee of the Research, Scholarship and Creative Activity pathway goal. This subcommittee was charged with the specific action item.

“Develop an information and data management infrastructure to support research and creative activities and maintain existing key measure report for Research and Graduate Studies”.

The subcommittee had cross -organizational membership with representation from the Division of Research and Economic Development, this Division includes several key offices - Research Integrity, Sponsored Programs, Economic Development and Undergraduate Research.

Additional membership came from the UNLV Libraries and the Graduate College. The subcommittee was chaired by a librarian, a recognition of the Libraries’ previous efforts to develop campus wide understanding and facilitate coordinated discussion on issues related to scholarly communication, scholarly impact and data management. The Libraries’ efforts gained traction by building deeper campus awareness of key issues but no coordinated and actionable cross-campus directions were determined. This was largely due to ongoing vacancies in the key campus leadership roles of Provost and Vice President for Research and Economic Development.

Although the assigned action item was broad, the Top Tier initiative was designed as a long-term plan with an iterative process. Specific timelines were not set for any action item as each subcommittee was expected to build out behind the action items with more detailed scope, planned steps and priorities for moving forward. Regular communications across the Top Tier subcommittees and with the Executive Committee enabled continuous feedback on progress, consolidation of goals and actions across the many subcommittees, and the assignment of additional resources, or the tabling of an item if necessary.

To enable progress and goal setting, the subcommittee parsed the action item into two clear and distinct areas of investigation and action.

- Management of institution wide data on Research/Scholarship/Creative Activity.
- Management of data produced through Research/Scholarship/Creative Activity

The article will describe the work on the first area, management of institution wide data on research, scholarship and creative activity.

Management of institution wide data on Research/Scholarship/Creative Activity

The assigned action item referenced a key measure report for Research and Graduate Studies. With the goals of the Top Tier initiative as a driver, the subcommittee decided to expand this scope to the creation of a sustainable report on the full breadth of research, scholarship and creative activities. Understanding and describing the activities and the strengths of UNLV faculty and researchers would be central to the success of the Top Tier initiative and allow the University to measure its progress towards Top Tier goals.

In the strategic plan for Top Tier, key measures of success were listed for each pathway goal so that the organization could articulate its aspirations and benchmark its progress. The key measures for the Research, Scholarship and Creative activity pathway are shown in Table 1.

Table 1: Key Measures of Success for UNLV Top Tier Pathway Goal - Research, Scholarship and Creative Activity

- At least \$120M/year of research expenditures by 2025.
- Increase commercially sponsored research, where appropriate, to at least five percent of total research expenditures by 2025.
- At least 200 doctoral degrees granted annually by 2025
- At least 120 non-faculty researchers with PhDs employed by UNLV by 2025.
- Rankings by the Carnegie Foundation for Advancement of Teaching, federal agencies, and other organizations (i.e., NSF, National Research Council, etc.), particularly Research University/Very High status.
- Impact of scholarship and creative activities in the academic and artistic communities, e.g.
 - Publications in journals with significant impact, such as those tracked by the Web of Science or equivalent indices.
 - Citations.
 - Invited or peer-reviewed presentations at premier academic conferences and symposia.
 - Books published with scholarly, peer-reviewed presses.
 - Commissioned and/or invited artistic exhibitions or performances.
 - Philanthropic support for our research, scholarship, and creative activities.

- Increase breadth and depth of graduate and undergraduate student participation in research, e.g.:
 - Articles (single-authored or co-authored with faculty members).
 - Presentations at academic conferences (singly or with faculty members).
 - Number of students working in laboratories.
 - Patents, startups, and other intellectual property developed by students or students jointly working with faculty.
- Increase breadth and depth of economic and cultural impact of the university's activities on our community, as measured by impact of campus/community cultural events, increased engagement with K-12 education, partnerships with nonprofits and public institutions to address social issues, invention disclosures, patents applied for and granted, licensing deals (both exclusive and nonexclusive), number of startups, other intellectual property, revenues, and jobs created from innovations initiated at UNLV.
- The number of master's and professional degrees granted per year, as appropriate for individual academic units.

These key measures had been identified by University Administrators as benchmarks and indicators for Top Tier progress. Any report developed needed to articulate these key measures as data points and facilitate tracking of those data points over time. The subcommittee developed questions to guide their investigation into current campus data practices for the key measure metrics. The questions were also used to identify additional data that could be

collected and utilized to better understand the research, scholarship and creative activities of UNLV faculty, staff and students.

Table 2: Questions developed to define Key Measures data points and to investigate data collection practices

- 1) What is the data point we are collecting to track the key measure?
 - a) Example: If the key measure is "At least \$120M/year of research expenditures by 2025" then we need data points that track research dollars.
- 2) Is the data point clearly defined and comprehensive? If not, work with appropriate campus entities to clarify and define.
 - a) Example: Does research expenditures provide the full picture of research effort at UNLV. Tracking dollars awarded and grant submissions would help provide a fuller picture.
- 3) Is the data point currently collected? If so
 - a) Who collects the data point
 - i) Individual, Academic College or Department; University Office
 - b) Is the data collected on a regular schedule? If not, what schedule should be utilized for reporting?
 - c) Is the data reported out beyond the collecting unit
 - d) Where is the data stored
- 4) Are there additional measures not listed that should be captured?

The subcommittee identified seven categories that the key measures spanned. Those categories are listed below.

- Research Funding
- Degrees Awarded
- Faculty Research Measures
- Graduate and Undergraduate Research Measures
- Organizational Research Measures
- Demographics
- External Impact on the Community

Utilizing categories enabled more targeted outreach with stakeholders, focusing the discussion on their specific areas of responsibility. The subcommittee worked with stakeholders across campus including the Division of Research and Economic Development, the Graduate College, the Office of Faculty Affairs, the Office of Institutional Analysis and Decision Support and College Deans. The information gathered was collated for review. Appendix A shows information gathered for several of the categories.

Findings

The findings (Appendix A) highlighted organizational issues around siloed data capture and lack of clarity on data stewards, data stakeholders and data reporting schedules. It was clear that there was no centralized approach to gathering and reporting on all the identified metrics.

There was no one campus unit or department responsible for gathering, storing or reporting the full breadth of the data. Instead, individual colleges and administrative units collected the data for their local purposes and it varied as to whether that data was shared beyond the collecting unit. If it was distributed further, the group could not ascertain that it was done on a regular and consistent basis unless needed for national reporting. Several different systems were used to store the data and to generate reports or analysis. There was no operational interoperability between the systems.

Next Steps

The subcommittee's reported their findings and recommendations to the Top Tier Executive. The report stated the need for a centralized campus approach and asserted that this is an issue that needs a campus wide solution and identified leadership. Those currently involved in collecting the key measures data are distributed across campus, utilizing different systems and have different aims and motivations for the data they collect. It is not feasible to expect a solution to organically develop from current practice. Instead an intentional effort is required to provide clarity on the data points to collect, lead campus messaging about the purpose and goals of collecting this data and to facilitate cross-organizational efforts to enable the system integrations needed for success.

The subcommittee identified the annual faculty activity reporting process and the system used for that process, as an area to focus and build on, to begin the development of effective RIM. The faculty annual activity report captures information about the faculty member and his/her

research and creative activities, including many elements identified in the key measures data points. Currently UNLV uses Activity Insight's Digital Measures tool for annual faculty activity reporting. This system is not mandatory, not every College has adopted it so Digital Measures is not currently capturing the full breadth of UNLV activity. Additionally there are no active integrations between Digital Measures and any other campus system. If the use of Digital Measures (or another suitable system) for faculty activity reporting was mandated and the system was designated as the campus central record for faculty information, this would clearly centralize data gathering. Once this centralization has been established it then enables the identification of needed integrations and interoperability with other campus systems.

The subcommittee recommended to Top Tier Executive that a more targeted committee be put together with the goal of a broad campus investigation into RIM needs at UNLV, and the available systems and tools to support it - including existing systems and practices in place. This committee would then make a recommendation for how to implement effective RIM, including which systems to use, and resources needed - both in terms of skills, roles and dollar costs. The subcommittee's report was well received and it is expected that the committee will be approved and charged in late spring 2017, with substantial library representation.

UNLV Libraries is also undertaking additional initiatives to highlight the benefits a comprehensive RIMS/CRIS could bring to UNLV and to lay the foundations for such a system. Firstly the Libraries is working with data outputs from Digital Measures to ingest bibliographic records of faculty work into its institutional repository (IR), Digital Scholarship@UNLV. Where available and permitted by authors and publishers, the full text of these records is also

uploaded. Although this is not a fully automated process it does demonstrate how data can be reused across systems in meaningful ways and it joins the Libraries IR to the broader campus ecosystem.

Secondly the Libraries has put together a proposal to “backfill” Digital Measures. Digital Measures was implemented at UNLV in 2013 and the faculty that use this system have not put in earlier data. There is no centralized campus record of their scholarship and research activities prior to that year. As discussed in this article, having a full centralized record of faculty scholarship and creative activity in one system is key to effective RIM. Therefore the Libraries is proposing a project to input bibliographic records for all scholarship of current faculty who use Digital Measures. The Libraries’ has the skills and knowledge to establish consistent standards for ingest of bibliographic data and is the obvious campus entity to fulfill this task. If at a later date a decision is made to move away from Digital Measures, having clean and consistent data in the system will enable error-free export to whichever system is the replacement.

An additional next step is the Libraries’ implementation of an institutional ORCID pilot. The key to facilitating interoperability across systems is the use of common standards. The Libraries will pilot the ORCID ID standard in spring 2017 and will pursue integration with Digital Measures to test the potential of ORCID as a key standard for interoperability at UNLV.

Conclusions

The project described in this article, was led by a librarian and although not specifically a UNLV Libraries project, the Libraries was able to leverage its knowledge and expertise to drive this conversation. Through this work, the Libraries has established itself as an integral partner in this discussion and has been able to further awareness of the skills of its staff and the relevant services it provides to campus.

UNLV is not unique as it strives to develop a stronger approach to managing information about its faculty, their activity and the impacts of their work. RIMS/CRIS are an evolving marketplace and adoption is growing across university campuses worldwide. Libraries should use this as an opportunity to highlight their unique domain expertise and the key role it plays in effective RIM.

The project described in this article, identifying key research metrics and documenting current campus practices for gathering and reporting them - is something that could be replicated by a library as a way to highlight the need for effective RIM on their campus. The results of such a project can provide an entry point to the campus-wide conversation. By being part of that conversation the library will be in a position to leverage their expertise to develop a strong leadership role on campus.

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Re-evaluated August 1, 2016

Appendix A: Key Measures and Additional Metrics – Current Practices and Systems
Category: Research Funding

Key Measure	Listed in Top Tier document as a key measure (yes/no)	Currently Collected/Counted (yes/no)	If currently collected, who is responsible	What "system" does the data reside in?	How frequently should the data reported (e.g. annually, quarterly etc)
Research Expenditures	Yes "At least \$150M/year of research expenditures by 2025"	Yes. We are using the NSF Total R&D Expenditure amount that we provide to NSF around January/February following the close of the Fiscal Year.	Office of Sponsored Programs (OSP)	No system. We complete the NSF Survey each January/February for the prior fiscal year	Annually. It would be very difficult to report more frequently since the survey is very comprehensive and takes considerable time to compile.
Proposal dollars submitted	No	Yes	OSP	OSP Pre-award database	OSP already reports this data on a quarterly and annual basis
Award dollars received	No	Yes	OSP	OSP Pre-award database	OSP already reports this data on a quarterly and annual basis
Source of Funding	yes "Increase commercially sponsored research, where appropriate, to at least five percent of total research expenditures by 2025"	Yes. We track industry funding, but the figure chosen for this metric is the one from the NSF Survey. See above for information	OSP	no system. We complete the NSF Survey each January/February for the prior fiscal year	Annually. It would be very difficult to report more frequently since the survey is very comprehensive and takes considerable time to compile.

Category: Faculty Research Measures

Key Measure	Listed in Top Tier document as a key measure (yes/no)	Currently Collected/Counted (yes/no)	If currently collected, who is responsible	What "system" does the data reside in?	How frequently should the data reported (e.g. annually, quarterly etc)
Journal Publications # and impact (impact factor, eigenvalue etc)	Yes. "Publications in journals with significant impact, such as those tracked by the Web of Science or equivalent indices	Not systematically. Division of Research and Economic Development (DivRED) Dev hired a Consultant to run a report in 9/14, not sure of plans to repeat	Library; DivRED	Library can "mine" databases such as Scopus and Web of Science; Digital Measures	TBD
Citation of work (include h-index)	Yes	Not systematically. Division of RED hired a Consultant to run a report in 9/14, not sure of plans to repeat	Library		TBD
Presentations	Yes "Invited or peer-reviewed presentations at premier academic conferences and symposia"	Faculty Annual Activity Report (FAAR) process should surface this information but is not currently systematically collected	RED, Office of Executive Vice President and Provost (EVPP); individual departments and colleges	Digital Measures	TBD
Published books	Yes "Books published with scholarly, peer-reviewed presses"	Annual FAAR process should surface this information but is not currently systematically collected	EVPP office; individual departments and colleges	Digital Measures	TBD
Artistic exhibitions and/or performances	Yes "Commissioned and/or invited artistic exhibitions or performances"	Annual FAAR process should surface this information but is not currently systematically collected	EVPP office; individual departments and colleges	Digital Measures	TBD
Honors and awards (prizes, societal fellowships etc.)	No	No	DivRED and EVPP have awards they are responsible for local to UNLV or Nevada System of Higher Education (NSHE)		TBD

Altmetrics (alternate forms of measuring impact)	No	No	Library		TBD
Editorships	No	Annual FAAR process should surface this information but is not currently systematically collected	EVPP office; individual departments and colleges	Digital Measures	TBD

Category: Graduate and Undergraduate Research Measures

Key Measure	Listed in Top Tier document as a key measure (yes/no)	Currently Collected/Counted (yes/no)	If currently collected, who is responsible	What "system" does the data reside in?	How frequently should the data reported (e.g. annually, quarterly etc.)
Authored articles - Grad Students	Yes. "Articles (single-authored or co-authored with faculty members). "	Not systematically	Graduate College	Qualtrics	Annually
Presentations - Grad	Yes "Presentations at academic conferences (singly or with faculty members)."	Not systematically	Graduate College	Qualtrics	Annually
Intellectual property - Grad	Yes "Patents and other intellectual property developed by students or students jointly working with faculty"	Not systematically	DivRED	Available Technologies database	
Authored articles - Undergrad	Yes "Articles (single-authored or co-authored with faculty members). "	Yes - indirectly through surveys of faculty and students	Office of Undergraduate Research	Qualtrics	Annually
Presentations - Undergrad	Yes "Presentations at academic conferences (singly or with	Yes - indirectly through surveys of faculty and students	Office of Undergraduate Research	Qualtrics	Annually

	faculty members)."				
Intellectual property - Undergrad	Yes "Patents and other intellectual property developed by students or students jointly working with faculty"	Yes - indirectly through surveys of faculty and students	Office of Undergraduate Research	Qualtrics	Annually
"Hands on" research experience at UNLV	Yes "Number of students working in laboratories"	Check with Office of Undergraduate research	Office of Undergraduate Research	Qualtrics	Annually
# of current doctoral students	No	Yes	Graduate College / Decision Support	MyUNLV	Term