

9-12-2018

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Recommended Citation

Christian, Elizabeth; Balek, Kathryn; Hudock, Sandy; and Gonzales, Rhonda (2018) "Librarians' Roles in Establishing a Multidisciplinary Research Institute," *Collaborative Librarianship*: Vol. 10: Iss. 2, Article 7. Available at: <https://digitalcommons.du.edu/collaborativelibrarianship/vol10/iss2/7>

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Abstract

This article describes how four librarians contributed to the founding and first-year activities of a multidisciplinary research institute at a regional comprehensive university. The Institute of Cannabis Research (ICR) is the first multidisciplinary research institute on cannabis, an emerging and often controversial field. As faculty representatives on the institute's steering committee and working groups, librarians were able to leverage interdisciplinary expertise to assist in organizing and disseminating cannabis research. Examples of the reciprocal benefit to both the institution and the library are shared.

Keywords

Cannabis, multidisciplinary research, interdisciplinary research, research institute, academic libraries, academic publishing, collaboration, controlled vocabulary

Peer Reviewed Article

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Abstract

This article describes how four librarians contributed to the founding and first-year activities of a multidisciplinary research institute at a regional comprehensive university. The Institute of Cannabis Research (ICR) is the first multidisciplinary research institute on cannabis, an emerging and often controversial field. As faculty representatives on the institute's steering committee and working groups, librarians were able to leverage interdisciplinary expertise to assist in organizing and disseminating cannabis research. Included within this article are examples of the reciprocal benefit to both the institution and the library.

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Introduction

Inter- and transdisciplinary (ITD) research are pushing traditionally prescribed borders within the academy both epistemologically, as institutes and universities seek to address confounding real world problems, and sociologically, as researchers expand their own self-concepts through multidisciplinary collaborations. Current research invokes Foucauldian notions of innovative rupture and transgression that gener-

ate knowledge spaces within which ITD can occur¹. These spaces offer the opportunity for librarians to take an active, discipline-agnostic role in the collection, preservation and dissemination of research across all areas.

Turnbull characterizes knowledge spaces as containing "linked sites, people and activities, [which] may differ in their epistemologies, methodologies, logics, cognitive structures or their socio-economic contexts," that share localness.² These spaces can manifest several levels of



approach, including multidisciplinary, where experts contribute findings from their own disciplines to address a common problem; interdisciplinarity, where they jointly address a problem that requires the melding of disciplines; and transdisciplinarity, in which they achieve a higher level of synergy. Transdisciplinarity “implies a fusion or integration of disciplinary knowledges; it embraces complexity and multidimensionality, and seeks to produce spaces where new languages, logics, and concepts can give rise to generative dialog.”³ Translational research, the multi-phase process whereby scientific research can be ‘translated’ into medical practice, exemplifies these concepts. Though evaluators are critical of the timeframe for completion, which ranges from 17-24 years, this model includes “a bidirectional dynamic translational process with practice influencing research and vice versa.”⁴

Multi- and interdisciplinary research is on the rise as universities, funders, and policymakers recognize the need to address complex problems from a range of perspectives.⁵ The 2005 report *Facilitating Interdisciplinary Research* from the National Academies Press observed that the number of interdisciplinary research centers or institutes at colleges and universities is steadily growing, sometimes outnumbering traditional academic departments.⁶ The report includes a list of 23 key conditions that must be met to create and sustain an effective interdisciplinary research center, including recommendations such as “science and engineering PhDs trained in research administration,” and facilitating “chance meetings between researchers, such as [at] on-site cafeterias.”⁷ Mention of the library or librarian, however, is nowhere on the list.

Interdisciplinary research is challenging, largely because of cultural differences between disciplines.⁸ Each academic discipline has its own epistemology, values, and research methods. When attempting to manage, conduct, and publish research through a single methodology and

conceptual framework, miscommunications and disagreements arise. Librarians can provide leadership in multi- and interdisciplinary research and mediate these differences. Unlike faculty members in other departments, who usually hold an undergraduate degree, a master’s degree, and a doctoral degree all in the same discipline, academic librarians, “by the nature of professional preparation, have an interdisciplinary perspective.”⁹ They are experts in examining research across disciplines and in teaching others how to recognize disciplinary conventions while conducting research. Simmons calls this acting as a “disciplinary discourse mediator” and contends this to be part of the librarian’s role in their daily interactions.¹⁰ By teaching students how to select databases, use subject headings, and construct complex searches, librarians are sharing tacit knowledge of the discipline. Faculty members have long since internalized their discipline’s conventions and often overestimate their students’ ability to correctly identify, interpret, and imitate this knowledge. Librarians, however, are consciously aware of the differing values, methods, epistemologies, and constructs that shape disciplinary discourse.

Because of this, multi- and interdisciplinary research stands to benefit from librarian involvement at all stages of the research process. Libraries would also benefit from partnering with research institutes to gain awareness of the scope of research, develop collections, and provide appropriate data management, publishing, and preservation services.

The Institute of Cannabis Research

Colorado State University-Pueblo is a small regional comprehensive university in a state where both medical and recreational marijuana sales are legal. Colorado State University-Pueblo, the state of Colorado, and Pueblo County established the Institute of Cannabis Research (ICR) in June 2016. On June 6, 2016, Gov-

ernor Hickenlooper signed SB 16-191, which approved the proposal and granted CSU-Pueblo \$900,000 to fund scientific and social science research of marijuana and other matters that affect the state and its regions¹¹. These funds comprised a campus-wide call for proposals initiated in August 2016.

On June 13, 2016, the university system and Pueblo County signed an excise tax revenue funding agreement that provided the institute with an additional \$270,000 and commissioned a community impact study to evaluate the effects of medical and recreational legalization on Pueblo County residents and businesses. Pueblo County commissioners requested an “analysis of the social and economic impacts, water and power usage impacts, and optimal buffer zones between sites that grow low THC (hemp) and high THC (legally approved recreational or medical) cannabis.”¹² These studies involve seven faculty from five different disciplines as principal investigators, and numerous faculty from other departments as co-principal investigators. Of the requests, the area that elicited the most potential for interdisciplinary research was social impacts, which allowed professors in nursing, sociology, and education to pursue various research projects.

The ICR’s mission is to “generate new knowledge of cannabis and its derivatives through research and education that improves lives and contributes to science, medicine and society.” Specific goals within its vision statement include “consider[ing] additional research strands that may include the humanities, sciences, technology, engineering, and math disciplines, as well as the cannabis industry development; and advanc[ing] understanding of cannabis-related public policy and socio-economic issues by serving as a source of cannabis-related education and information.” As an emerging field, significant social and legal barriers exist to cannabis research, particularly outside of medicine and pharmacology. There are few outlets

for describing or publishing multidisciplinary cannabis research.

Library Impact on the ICR

In June 2016, the University Provost assembled the ICR Steering Committee and established three working groups, each responsible for meeting one of the ICR’s goals: 1) to organize and host a multidisciplinary academic conference on cannabis research and industry developments; 2) to publish the conference proceedings and a peer-reviewed multidisciplinary journal; 3) to conduct pure and applied cannabis research across multiple disciplines.

At Colorado State University-Pueblo, the library is an academic unit equivalent to a college, with a dean, department chair, and tenure-track faculty members. Library faculty fall into two divisions: Information Management Services (IM) and Education, Research, and Outreach Services (EROS). Following the governance model specified in the Faculty Handbook, the Provost appointed the five academic Deans, as well as representatives from each college and the library, to the ICR Steering Committee and working groups. The Dean of Library Services served as a member of the Steering Committee and as chair of the publications working group. The EROS Director was appointed to both the Steering Committee and the budget working group. The Scholarly Communications Librarian joined the conference and publications working groups.

The ICR Conference

One of the ICR’s goals was to host the first, national, multidisciplinary research conference on cannabis. The charge of the conference working group was to write the call for papers, review submissions, assemble the conference program, identify and invite keynote speakers, and manage all meeting logistics. The Scholarly Communications Librarian had prior work experience in



both academic conference planning and academic publishing, which proved useful in accomplishing these tasks.

Academic research conferences on cannabis are few, and often weighted toward biomedical research. The conference working group solicited presentations and keynote speakers that reflected the ICR's multidisciplinary model of "all things cannabis." The conference received nearly 90 abstract submissions, all of which underwent to blind peer-review. The working group arranged the accepted abstracts into five tracks, and the Scholarly Communications Librarian took the lead in editing and formatting abstracts for style and consistency.

Library services became an important part of the group's workflow. Based on the library's recommendation, the group decided to solicit and archive conference materials, including slides, posters, and video recordings of the keynote presentations, in the institutional repository. The Scholarly Communications Librarian used the library's subscription to Adobe Creative Suite to produce the final conference program, which demonstrated a proof of concept to the state legislature.

The multidisciplinary membership of the conference working group sparked several discussions about disciplinary differences in conference structure and procedures. Representatives from engineering expected two rounds of blind review – first for abstracts, then for full papers – before making final decisions about the program; representatives from the humanities did not expect to receive full papers from most presenters.

ICR Publications

When the Library Dean first learned that the newly formed ICR sought to publish a research journal, she asked the Provost if she and other librarians could be included on the planning

group. The Library's strategic plan included a goal to support publishing on campus and the Library was already collaborating with the Honors Program to host an open access undergraduate research journal on the Open Journal Systems (OJS) platform. The Dean argued that the library had the expertise needed to lead the ICR in producing a journal.

Originally, the library assumed potential hosting was possible on the OJS platform, similar to their other journal project. However, as plans developed, it became clear that the ICR Steering Committee envisioned a more traditional commercially published product. This would require finding a commercial open access publisher to work with the ICR. The group also determined publication of the conference proceedings would be either as a standalone publication or in conjunction with the journal.

While individual faculty members including librarians on the planning group had experience publishing their own work, librarians also had experience working with publishers as customers. Because of their experience with publishing practices and subscriptions across all disciplines, library faculty were in a unique position to work on this multidisciplinary project. Their knowledge of many publishing-related considerations was key to developing the parameters for the journal project. For example, librarians provided expertise in the areas of contract negotiation with journal vendors, publishing formats including print versus online, publishing models including fixed versus rolling models, access models including both green and gold open access, issues surrounding article publication charges, copyright considerations, quality and suitability of various publishers, and discoverability issues including indexing and access opportunities.

Another way in which librarians provided leadership for this project was by arguing for open



access as the model of choice for the journal. Librarians were able to articulate to other committee members why an open access model was crucial to providing the highest level of access, in terms of removing both price and access barriers. They felt this was especially important given the global impact of cannabis related research as a relatively new area of scholarship.

As part of the process of identifying a publisher, the committee needed to obtain the services of high profile cannabis researchers to serve as editors of the conference proceedings and the research journal. Librarians conducted a thorough literature review in the Social Sciences Citation Index and the Science Citation Index to identify the most influential cannabis researchers, not only in biomedicine, but also in the fields of public health, sociology, social work, engineering, and economics. The list eventually resulted in a successful agreement with a leading scientist to serve as guest editor of the conference proceedings. Their librarian-specific experience with research in multiple fields, and experience in using citation indexes was an asset to the committee in this regard.

Another strength librarians brought to the project was their multidisciplinary experience with publishing and research. While individual faculty members brought their disciplinary knowledge, librarians were used to working within and across disciplines and were able to help facilitate agreement between other faculty members. This was especially helpful due to the multidisciplinary nature of both the conference and the journal. In this role, librarians inhabited the knowledge space between and among researchers, observing, "There is not merely one thought style but a plurality of styles which co-exist...a collaboration of academic as well as non-academic thought styles in the process of problem solving."¹³ Disciplinary conventions around publishing led to lengthy discussions about appropriate titles, content, focus, and scope. In discussions about the dissemination of

conference proceedings, mathematicians objected to calling the publication "ICR Conference Proceedings," believing it would be mistaken for a peer-reviewed publication like the *Proceedings of the American Mathematical Society*. Representatives from the school of business suggested the ICR not publish the proceedings open access and instead charge for each download, using the example of the Harvard Business Review Case Studies series.

The publications working group began by identifying open access publishers and presses that could provide the necessary editorial, typesetting, cataloging, and dissemination services to publish the conference proceedings. A query to the LIBLICENSE listserv brought back several thoughtful recommendations on how to approach the project. The group prepared a publishing proposal and submitted it to several publishers for consideration. One major open access publishing company was interested in publishing the proceedings, and expressed interest in collaborating with the ICR to establish a peer-reviewed scholarly journal. The group successfully secured a publishing deal with this publisher to produce both the peer-reviewed journal, *Journal of Cannabis Research*, and the conference proceedings as a journal supplement. Contract negotiations included discussions around open access, author processing charges, and indexing, all areas where the librarians could provide guidance to the rest of the working group. The final seven-year contract included the provision that the ICR will cover author-processing charges (APCs) for all published articles for the first five years, followed by 10 APCs per year for the next two years. The publisher is responsible for indexing the journal in appropriate indexes, such as Scopus and PubMed, and earning an impact factor. The ICR publications working group worked with the publisher to identify potential editors-in-chief, based on the literature searches conducted by the librarians and the added expertise of the researchers on the working group.

Together, the ICR publications group and the publisher interviewed top candidates for the position and negotiated a multiyear contract. The ICR publications group continues to work closely with the editor-in-chief to determine the focus and scope of the journal and to recruit editorial board members and reviewers. The ICR administration was very happy and saw the result as a major success for the librarians involved. Lessons learned from this experience show that librarians bring a unique skill set to publishing projects, which other faculty members do not possess. Their knowledge of copyright issues, access models, discoverability of journal content, and contract negotiation with publishers positioned them to take a leadership role in this aspect of the newly founded ICR.

While the conference working group oversaw planning and the execution of the academic conference, the publications working group focused on disseminating the conference proceedings and materials afterward. The publications group wrote to conference presenters, encouraging them to submit their presentation materials to the institutional repository. The Dean of Library Services and the Provost negotiated rights to publish the keynote presentations in the conference proceedings, and contracted one of the library's archives assistants to transcribe the keynote presentations using archives transcription software. The Instructional Technology Center recorded the videos and provided the library with both an archival-quality version for the institutional repository and a streaming version.

During journal contract negotiations, the publications working group debated whether to self-publish the conference proceedings or to wait until the journal launched to publish it as a journal supplement. The Scholarly Communications Librarian, based on her knowledge of copyright law, recommended the library assemble a pre-print version of the proceedings and place it in the institutional repository for an earlier release

date. Since the librarian was experienced in digital publishing, the group supported the library's self-publication proposal. The publisher accepted the arrangement, under the condition that the pre-print did not include a doi, and agreed to re-issue the proceedings at a later date, as a journal supplement.

Cannabis Research

The need to conduct pure and applied research on cannabis in multiple disciplines led to the creation of the ICR. The purpose of the ICR's Budget Working Group was to establish a grant process for state-funded research proposals, which amounted to \$800,000 of the entire \$900,000. The EROS Director was appointed to both the ICR Steering Committee and assigned to the Budget Working Group. The first year state funds came in June 2016 and the first round of proposals were due September 15, which posed a challenge in disseminating the call to faculty. To accommodate the tight timeline, the Budget Working Group adapted the existing SAB's Supporting Effective Educator Development (SEED) grant protocol for the ICR. The librarian repurposed the SEED documents based on the ICR white paper. These went through multiple iterations with feedback and final approval from the Steering Committee. Three tracks distinguished the first call for proposals: Major Project, Pilot Study, and Professional Development. Ultimately, the SAB acted as the review panel for the ICR proposals. Grant funds were to be expended by the end of June 2017, and funded projects were expected to result in data and/or publishable results by December 2017.

Having served on the SAB for multiple years, the EROS Director became intimately involved with both the call for, and awarding of, ICR funds. Using past experience evaluating SEED and Summer Undergraduate Research Proposals for the SAB, which similarly ranged from across

all disciplines, proved valuable for this. Additionally, this librarian has served as a reader for National Science Foundation Digital Library proposals multiple times, resulting in extensive grant reading experience. A valuable outcome for the library was gaining knowledge of new faculty research areas, which helped in expanding the collection in support of those initiatives.

The state of Colorado increased ICR funding the following year to \$1.8 million. This generated a second call for proposals based on the mandates of the funding, and again the SAB acted as the review panel. Again, the EROS Director evaluated the 2018 proposals as a member of the SAB. While there were no specific library-related requests made during the first rounds of ICR funding, there is an option to include funds for information resources to support projects.

Cataloging

When there are interdisciplinary collaborations, researchers maintain the boundaries of their respective disciplines, which then manifests in the messy work of articulating mutually palatable publication protocols. Beyond academia, cannabis research needs to be available to those in the industry itself as well as the general public. A major theme congruent with Foucault's notion of disciplinary transgression emerged: the slipperiness of language to address the broadly ranging aspects of cannabis. One plant, its vernacular term, "marijuana," has a charged social history, while "cannabis" acts as a more sanitized version found in medical thesauri. With the conference successfully concluded, presenters began submitting posters and presentation materials for inclusion in the institutional repository at CSU-Pueblo. Upon review of those materials, the question of how best to catalog cannabis-related research and language became a bigger issue.

A review of the proceedings of the first ICR Conference shows a clear preference for the

term "Cannabis" over "Marijuana." This preference is in direct contradiction with language in the Library of Congress Subject Headings (LCSH), which prefers the term "Marijuana" over "Cannabis." The Library of Congress Subject Headings is the primary controlled vocabulary used in the United States. Most major publishers, from popular fiction to peer-reviewed academic journals, use the LCSH. In addition, upon survey of the LCSH preferred terms, the Cataloging Librarian began to question the structure of terms relating to cannabis. In LCSH, subject terms are determined based on what is the standard term in contemporary American English. There is a preference for expressions over jargon and technical terminology. While there are terms in the LCSH for both marijuana and cannabis, the Cataloging Librarian found the relationship between these headings to be unclear. While the term "Marijuana" had a general relationship with the term "Cannabis," within the list, other preparations of the cannabis plant, such as bhang and hashish, were narrower terms under "Cannabis." Other terms were misleading due to term connotations; were unavailable because of limitations on use; or had not yet been created to describe the topics being researched.

The Cataloging Librarian performed preliminary research to determine how cannabis researchers use these terms. Due to the interdisciplinary focus of the ICR, they consulted resources across disciplines. The librarian reviewed resources considered authoritative, such as dictionaries and encyclopedias, but only a small number of dictionaries included definitions identical for both terms; most of the dictionaries defined cannabis as the whole plant and marijuana as a particular preparation of the plant. Encyclopedias varied on term use with cannabis sometimes referred to it as the entire plant and other times referred to only as a variant term for marijuana. It may be of note that all of the print encyclopedias had bibliographies

with resources published no later than the early 2000's and none of the encyclopedias discussed the legal use of cannabis. An expanded search for subject headings and keywords in academic and medical research databases displayed a clear preference for cannabis as a term, while searches for industry associations and in industry-related databases showed the use of both terms. A survey of news and popular articles found that use of the terms marijuana and cannabis is often interchangeable – sometimes with both terms used within the same sentence.

As an initial step and a short-term solution, the term “Cannabis” replaced the term “Marijuana” in any Library of Congress Subject Headings within the CSU-Pueblo institutional repository, with the understanding that further research was needed for the long-term.

The Cataloging Librarian began this research by determining if and how the LCSH would better meet the needs of CSU-Pueblo and the ICR. Two criteria were identified – the addition of needed subject headings and a clarification of the relationship between cannabis and marijuana. To these ends, research began to prove a hierarchy of “Cannabis” as a broader term for “Marijuana.” This culminated in a proposal sent to the Library of Congress in August 2017, which changed this hierarchy and to added scope notes defining when to use one term over the other. Currently, new term proposals relating to cannabis research, such as “Cannabis industry,” are sent into the Library of Congress as needed. The example, “Cannabis industry,” was submitted in August 2017 and accepted into the LCSH in January 2018 as a non-preferred term for “Marijuana industry.”

Research into other existing controlled vocabularies found no vocabularies that were best suited for cannabis research at CSU-Pueblo and the ICR. Controlled vocabularies studied were determined not to be broad enough for interdisciplinary cannabis research, specific enough for

a focus on cannabis, or both. Every vocabulary found also held a similar bias against cannabis use. The Cataloging Librarian is researching the creation of a local controlled vocabulary specifically for cannabis research for use with ICR resources. This need to create a new vocabulary reflects transdisciplinary research's need to consider “the tangled plurality of styles of scientific reasoning...that are constitutive of epistemological pluralism.” The need to create an integrated taxonomy to disseminate cannabis research effectively “puts knowledge in circulation,” while creating a new framework expressing various disciplines' concepts, methods, and theories.¹⁴

ICR's Impact on the library

Collection Development

As a result of being deeply involved in ICR operations, the library had detailed knowledge of ICR research needs. The EROS Director, as a member of the budget working group, reviewed all ICR research grant proposals and worked with a research team to perform literature searches, which informed collection development and research support services. In fall 2017, the College of Humanities and Social Sciences announced a new minor in Cannabis Studies, a 22-credit program focused on civic responsibility, designed to complement degrees in social work, sociology, history, and political science. The library earmarked \$3,438.22 of state grant funds to purchase new materials to support the Cannabis Studies curriculum and ICR grant researcher needs. New materials included seminal works, as well as several recent titles on cannabis research in the sciences and humanities, and publications by the conference's keynote speakers.

Research Support Services

Library faculty in the EROS department all developed a working knowledge of cannabis research in their respective liaison areas. Even before the announcement of the Cannabis Studies



minor, ICR researchers encouraged their students to explore the topic in research assignments. Students in nursing, biology, chemistry, social work, and writing came to the library looking for research help, often with misconceptions about the scope and breadth of existing cannabis research (given federal restrictions on testing Schedule I drugs on humans). The EROS librarians developed a cannabis research guide on LibGuides that cross-links with several courses. One professor in psychology, aware of her impending participation in the county-funded impact study, requested that the EROS Director (who is liaison to the psychology department) conduct a literature review on cannabidiol treatment of childhood epilepsy. This was an opportunity to work directly with that researcher to frame comprehensive searches and utilize the campus wide citation manager program to compile and share the results.

Cataloging

Describing cannabis research within the context of the institutional repository requires a general knowledge of the topic. As well, ingesting an increased workload of resources led to the development of new workflows and procedures to organize and describe those resources. Changes to language were a necessary result of the ICR's work and impact both the library at CSU-Pueblo and the profession as a whole. New topics in cannabis research require new subject headings to describe and access that research. This is evident in the creation of new terms in the LCSH and in the need for a controlled vocabulary to describe cannabis research with more granularity. Cannabis research is still an emerging field and, as long as cannabis legalization continues to advance, the body of literature on cannabis research will grow, and need to be discoverable.

Future Directions

The library will continue its support of the ICR's programs and mission through collection development and related services. The library will expand its collection of multidisciplinary cannabis studies research materials to meet the curricular needs of the Cannabis Studies minor. The library can also provide support to researchers with training on library services and platforms such as citation managers, literature searches, and collaborative research platforms. The library's cannabis research guide is now available by request as a Community template in LibGuides. The library's in-house publishing program will continue to produce ICR technical reports and other grey literature in its digital repository.

Conclusion

The Institute of Cannabis Research represents a new direction for CSU-Pueblo, with increased focus and funding for research at what is primarily a teaching institution. The scale and scope of research activity on campus is expanding as faculty in multiple disciplines pursue new lines of inquiry. The field of cannabis research is still new and largely undefined. Researchers will need to be able to locate existing literature and identify venues in which to publish new research, particularly multidisciplinary research. The ICR also plans to produce a series of technical reports on cannabis research, published in coordination with the University Library. Cataloging and indexing these works presents its own challenges related to the development or revision of new taxonomies and metadata. While the work of creating a taxonomy for cannabis research approaches transdisciplinarity, the research conducted by ICR is still multidisciplinary.

As interdisciplinary research efforts continue to grow, libraries will see new opportunities to leverage their expertise in disciplinary discourse and research dissemination. Librarians, by working with researchers in multiple disci-

plines, bring a unique perspective to interdisciplinary collaborations. Library participation in campus research initiatives also benefits the library by bringing about closer collaboration with faculty and increasing the depth and breadth of library collections. It also benefits the profession by expanding scholarly contributions of librarians in a variety of disciplines.