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Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

A Multisite Evaluation of an Emerging Institutional Research Capacity Building and Infrastructure Model for Advancing the Science on Disability/Health and Rehabilitation Research Capacity Building at Minority-Serving Institutions

January 2021

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Acknowledgements

The authors wish to acknowledge study participants across the five minority-serving institutions; North Carolina Agricultural and Technical State University (historically Black college/university [HBCU]), Alabama State University (HBCU), University of Texas Rio Grande Valley (Hispanic-serving institution [HSI]), Little Priest Tribal College (Tribal college or university [TCU]), Mercy College (HSI); and participants at the University of Maryland-Eastern Shore (HBCU), which served as a pilot test site. We would also like to thank our partners for their contributions to this study that include the Institute for Community Inclusion (ICI) at the University of Massachusetts Boston and South Carolina State University (HBCU). This monograph also reflects the contributions of staff members affiliated with the Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities at Langston University (LU-RRTC), in particular Ms. Nicole Wilkerson and Ms. Sharon Kernal.

We are appreciative of the support received from the Langston University Administration (President Kent Smith, Jr., Drs. Clyde Montgomery and Ruth Jackson [former and current Vice President for Academic Affairs, respectively], and Drs. Marsha Herron and Emily Harris [former and current Acting Deans for School of Education and Behavioral Sciences, respectively]).

This is a publication of the LU-RRTC. The financial support for this research was provided by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant numbers 90RT5024, 90RTST0001, 90ARST0001, and 90AR5029). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this monograph do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the Federal Government.

Citation

The recommended citation for this report is: Moore, C. L., Manyibe, E. O., Washington, A. L., Aref, F., Davis, D., Sanders, P., Sutton, C. W., Starr-Howard, R., Koissaba, B. R., McCray, S., Williams, N. F., Webb, K., & Muhammad, A. (2021). A Multisite Evaluation of an Emerging Institutional Research Capacity Building and Infrastructure Model for Advancing the Science on Disability/Health and Rehabilitation Research Capacity Building at Minority-Serving Institutions. Oklahoma City: Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities/Langston University.

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*The LU-RRTC is a component of the School of Education and Behavioral Sciences at Langston University.

Principal Investigator's Biosketch

Dr. Corey L. Moore
Director/Principal Investigator of Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities- Langston University

Dr. Corey L. Moore is the Principal Investigator and Research Director at the National Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities at Langston University (LU-RRTC) where he provides oversight for all Center research, training, knowledge translation, and research capacity building agendas, and serves as chief methodologist for all on-going research programs. He is also the Founding Chair of the Department of Rehabilitation and Disability Studies. Since coming to Langston University, Dr. Moore has served as Principal Investigator for sixteen (16) different United States Department of Health and Human Services and Department of Education research, training and service grants/cooperative agreements exceeding 20 million dollars. A transformational research leader, he has pioneered the development of various new research capacity building models (i.e., mentorship research skill building and institutional research infrastructure enhancement) in the field at minority-serving institutions. Inasmuch, he has directly or provided oversight as Principal Investigator for the federally-funded scientific mentoring of more than 60 early-career and visiting investigators, faculty scholars/Fellows, post-doctoral Fellows, and pre-doctoral and doctoral students/Fellows based at historically Black colleges/universities, Hispanic-serving institutions, Tribal colleges and universities, and Asian American and Native American Pacific Islander-serving institutions. He was an Institute for Rehabilitation Issues (IRI) National Scholar for the 38th IRI entitled: "*Serving Traditionally Underserved Populations*", has held the prestigious Delta Sigma Theta Sorority Inc. Distinguished Professor Endowed Chair (DPEC) and has authored or co-authored more than 60 refereed articles, monographs, and technical briefs. Prior to coming to Langston University, he was employed as a Research Assistant Professor (Research Scientist/Co-Principal Investigator) at the NIDILRR-funded RRTC for Persons who are Deaf and Hard-of-Hearing (RT-31)-University of Arkansas at Fayetteville. He has received several national research and service awards such as the National Rehabilitation Association's (NRA) Sylvia Walker National Multicultural Award, National Association of Multicultural Rehabilitation Concerns (NAMRC) Bobbie Atkins' Research Award, and Thurgood Marshall College Fund, Inc. Outstanding Leadership in Faculty Research Award. Dr. Moore is also a member of Kappa Alpha Psi Fraternity Inc. (Zeta Iota Chapter-University of Georgia, Spring 1992). He served in the Georgia and Kentucky National Guard as a medical specialist (combat medic: E-4 rank) with mechanized/light infantry units from 1990-1996. He earned his Bachelor of Arts in Political Science from the University of Georgia, Master of Science in Rehabilitation Counseling from the University of Kentucky, and Doctorate in Rehabilitation Research and Education from Southern Illinois University-Carbondale.

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Executive Summary

Disparate rehabilitation and health outcomes and experiences among people of color with disabilities (i.e., African Americans, Latinx, Native Americans or Alaskan Natives, Asian Americans and Pacific Islanders) in the United States (U.S.) are well documented (Atkins & Wright, 1980; Dzau et al., 2017; Horner-Johnson et al., 2014; Lukyanova et al., 2014; Moore, Wang, Johnson, et al. 2016; U.S. Bureau of Labor Statistics [BLS], 2017). There is growing consensus among scholars, federal research agency leaders, policy makers and strategists, disability advocates, and other stakeholders that this disparity crisis underscores the urgent demand for ongoing research to generate new scientific knowledge that can be translated into new practice interventions, assistive technology innovations, and disability policy and initiatives; and need to build the capacity of minority-serving institutions to play leading roles in carrying out national research response agendas aimed at alleviating such long-standing race-based inequities. Minority-serving institutions in the U.S., as defined in Section 21 of the 1998 Rehabilitation Act Amendments (Public Law 93-112) are historically Black colleges or universities (HBCUs), Hispanic-serving institutions (HSIs), American Indian tribal colleges or universities (TCUs), or another institution of higher education whose minority student enrollment is at least 50% (U.S. Department of Education, 2013).

Minority-serving institutions are underrepresented as grantees across the U.S. federal research and development (hereafter referred to as R&D) enterprise (Moore et al., 2012; Moore, Manyibe, Aref et al., 2017); and thus many remain marginalized to the periphery as research and innovation creators whose work could profoundly and positively influence rehabilitation and health outcomes among people of color with disabilities. A potential major contributor to outcome disparities is the under-participation of these institutions and their faculty scholars, including those with disabilities, in federally-sponsored disability/health and rehabilitation R&D (Manyibe, Moore, Aref, et al., 2017; Moore et al., 2015). Our seminal study (Moore et al., 2012), funded through a Delta Sigma Theta Sorority, Inc. Distinguished Professor Endowed Chair (DPEC) award, documented this participation inequity. We reported that HBCUs accessed disparate levels of National Institute on Disability, Independent Living, and Rehabilitation Research [NIIDILRR]) R&D investments; of the 229 observed "grantees" across seven different funding mechanisms in fiscal year (FY) 2010, none were HBCUs.

In response to the Moore et al. 2012 investigation, NIDILRR developed a 2013 absolute priority to establish a new national Rehabilitation Research and Training Center (RRTC) with two major aims. First, the Center would generate new knowledge about the rehabilitation outcomes and experiences of individuals with disabilities from traditionally underserved racial and ethnic backgrounds. Second, the RRTC would conduct research on the feasibility and potential effectiveness of new methods and models to advance disability/health and rehabilitation research capacity and infrastructure (e.g., office of sponsored programs, institutional review board [IRB], facilities, equipment, collaborative networks, collections, archives, databases, digital libraries, communication systems, statistical software, early career awards, and research centers) at minority-serving institutions. The agency subsequently selected Langston University (HBCU) as the RRTC grant award recipient. In October 2013, the RRTC on

Research and Capacity Building for Minority Entities at Langston University (LU-RRTC) was officially established. The Center represented a national multi-partner collaboration that included the Institute for Community Inclusion (ICI) at the University of Massachusetts Boston (Asian American and Native American Pacific Islander-serving institution [AANAPISI], South Carolina State University [HBCU]), and the Oklahoma Department of Rehabilitation Services.

The LU-RRTC partnered with ICI to design and implement the *Institutional Research Capacity Building and Infrastructure Model (IRCBIM)*; the Center's flagship study. The IRCBIM (NIDILRR grant numbers H133B130023 and 90RT5024, respectively), officially launched in October 2014, was grounded in the structural empowerment and critical mass theories. The model embraced a new research capacity building paradigm by holistically addressing individual, institutional, and systems factors that facilitate increased R&D participation and scientific productivity at these institutions. Research capacity building in this context is defined as a process of individual and institutional development that leads to increased skill levels and greater ability to conduct high quality R&D (Holden et al., 2012). These activities are designed to empower individuals, institutions, and organizations to define and prioritize problems systematically, develop and empirically generate applicable solutions, and translate and disseminate knowledge (Aref, 2009; Aref et al., 2017; Pager et al., 2012). For our purpose, the individual refers to faculty scholars and students. The institution means a minority-serving institution of higher learning to include administrative units, academic programs, and research centers, as well as systems (e.g., HBCUs and federal agencies) that function as a whole to sustain a healthy R&D enterprise. The model was designed to provide a structured and coherent framework for building the capacity of select participating institutions to conduct cutting-edge R&D; thereby increasing the production of translational culturally contextualized evidence-based solutions and technologies that help alleviate race-based disparities. Specifically, the goals of IRCBIM were to:

1. Systematically build the capacity and research infrastructure of minority-serving institutions by undertaking scientific studies that produce new knowledge, develop new ideas, and experiment with innovations that lead to improved outcomes and experiences among people of color with disabilities across the health and function, employment, and community participation domains.
2. Mentor and provide Fellows (i.e., faculty scholars participating in the Peer-to-Peer Mentor Research Team Academy [hereafter referred to as the Academy]) with in-depth knowledge of the research process, and equip them with practical scientific skills for the design and conduct of high-quality, rigorous research studies; and
3. Create awareness at these institutions about federal agencies that fund disability/health and rehabilitation R&D toward stimulating faculty scholars' and students' interest and activities.

The IRCBIM consisted of the following seven intervention components: (a) Peer-to-Peer Mentor Research Team Academy, (b) Grant-Writing and Management Training, (c) Manuscript Development Training, (d) Communities of Practice, (e) Technical Assistance-Infrastructure Issues Consultation, (f) Research Support Resources, and (g) Technical Support and Interventions. Activities embedded in each intervention component were designed to empower participating institutions to conduct innovative

disability/health and rehabilitation R&D that generates new needed knowledge. Unlike many previous models consisting primarily of segmented workshops that focused on enhancing individuals' research skills (Moore et al., 2012), this emerging model applies a holistic and integrated system approach. In other words, IRCBIM was designed to comprehensively addresses institutional issues (e.g., inadequate research infrastructure, policies and practices), individual investigators' research skill needs (i.e., methodology and grant-writing abilities), and policy and systems issues (e.g., underrepresentation and underfunded as grantees) that coalesce to prevent minority-serving institutions and their affiliated faculty members from fully participating in federally-sponsored R&D (Moore, Manyibe, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017). In addition, the framework was built to further cultivate an institutional culture that supports and enhances the academic pipeline infrastructure for developing the future cadre of well-trained disability/health and rehabilitation disparity research leaders of color.

The ICI coordinated the Academy; their responsibilities involved matching Fellows with seasoned and peer mentors, and providing mentorship services (i.e., manuscript and research proposal development). Further, they worked closely with the LU-RRTC team to ensure seamless implementation of research mentorship activities. The Academy was pilot tested at the University of Maryland-Eastern Shore (HBCU) between the dates of April 2014 and May 2015. The lessons learned were critical to informing the implementation of the intervention component. Dr. David Staten (Professor of Rehabilitation Counseling at South Carolina State University) implemented and coordinated the communities of practice program. Additionally, the LU-RRTC built a robust roster that included a list of consultants with expertise in research infrastructure areas who provided various technical assistance services on-campus (i.e., research strategic planning sessions, office of sponsored programs consultation, institutional review board consultation) and through webinars and conferences (i.e., grant writing, research methods, manuscript development trainings) to each institution participating in the model. The LU-RRTC research team was responsible for overall model implementation, monitoring, evaluation, and dissemination of the findings using knowledge translation strategies.

Purpose of the Research

The purpose of this evaluation was to assess the impacts of the IRCBIM intervention on the following five minority-serving institutions' disability/health and rehabilitation research capacity: North Carolina Agricultural and Technical State University (HBCU), Alabama State University (HBCU), University of Texas Rio Grande Valley (HSI), Little Priest Tribal College (TCU), and Mercy College (HSI). The model's intervention components represent structural empowerment and critical mass elements that are consistent with "a whole system" approach that calls for strategies designed to address individual and institutional research capacity building and research infrastructure issues. The following research question was addressed: How did participants evaluate the Institutional Research Capacity Building and Infrastructure Model (IRCBIM)?

Data Collection

A mixed methods approach consisting of qualitatively and quantitatively derived data was used to assess the model. Methodological triangulation was achieved through various data collection activities that included online surveys (respondents), semi-structured face-to-face interviews (key informants),

focus groups discussions (participants), document reviews, and site visit observations. Information garnered from faculty scholars, Fellows, administrators/staff and students at the five participating institutions, mentors, relevant documents, and researcher observations was analyzed to answer the research question.

Summary of Key Findings and Recommendations

Our key finding about the study participants' (i.e., survey respondents, interview key informants and focus group participants) perspectives of IRCBIM are summarized below. The recommendations that follow are presented for NDIILRR, NIH, other federal research agencies, and minority-serving institution leaders and faculty scholars to consider in an effort to address overarching challenges. Please note that the recommendations are quoted verbatim from the research study.

FINDING 1
A Well-Structured and Holistic Approach Supports Meaningful Research Capacity Building at Minority-Serving Institutions

IRCBIM embraced a whole system method, building on the interrelatedness of its intervention components in order to create complementary performance. Within the scope of the current study, this approach focused on how interventions can work together effectively to enhance research capacity and scientific performance. In line with this approach, all intervention activities focused on addressing the individual needs of each institution's policies and procedures that support scientific production. Accordingly, the evaluation sought to understand the perspectives of the participants regarding the model's various intervention features.

All Fellows, faculty members, administrators/staff, students, and mentors who directly or indirectly participated in IRCBIM felt that the overall structure of the model was excellent. Some of the positive features of and experiences with the model that participants thought were vital to increased research capacity included practical hands-on experience in developing and submitting a research proposal, grant writing training, manuscript development for submission to peer-reviewed journal, networking, collaboration, participation in communities of practice, availability of resources and support, research-team science approach (i.e., working together as team on research projects), and capable mentors/role models.

Recommendations

1.1: NIDILRR should develop additional funding streams targeting minority-serving institutions where IRCBIM field-test replications can be carried out, thereby exponentially extending the model's capacity building benefits to other minority-serving institutions. Mentorship should be included as a priority for this funding investment. The agency's Disability Rehabilitation Research Projects [DRRP], Rehabilitation Engineering Research Centers [RERC], and Spinal Cord Injury Model Systems mechanisms could be targeted as test hosts for IRCBIM's Academy feature adoption. In particular, a NIDILRR priority establishing an RERC on an HBCU campus with an engineering academic program would build their R&D capacity and

help to increase the number of well-trained scientists and engineers of color available to develop needed AT innovations.

1.2: Capacity building researchers should scale-up future field-tests longitudinally to identify which IRCBIM features are more effective over time for building disability/health and rehabilitation research capacity at minority-serving institutions. In light of the disproportionate corona virus (COVID-19) infection rates among people of color, researchers could assess the efficacy of mentoring strategies and models that facilitate early-career investigators' participation in COVID-19 research focused on persons of color with disabilities across employment, community participation, and health and function outcome domains.

1.3: Researchers should continually update their cultural competency knowledge to ensure they design and implement culturally appropriate capacity building interventions at minority-serving institutions. These institutions are complex ecosystems that require interventions that consider the collective individuals as well as the inanimate unique cultural contextual aspects such as their missions, histories, traditions, and geographical locations.

FINDING 2
Academy Fellows' Research Productivity Increased

Increasing scientific productivity is a major research capacity building aim at minority-serving institutions. Factors that have been found to contribute to researcher efficiency include individual variables (e.g., internal motivation, level of education, self-efficacy), institutional variables (e.g., administrative culture, availability of research infrastructure, manageable teaching loads), external factors (e.g., peer review system, family responsibilities) (Aref et al., 2017; Ginther et al., 2011a, 2011b; Moore et al., 2012) and topic choice (Hoppe et al., 2019). Study findings have also revealed the utility of such productivity. For example, administrators at institutions of higher learning often use research productivity to make important decisions such as tenure, promotion, and salary adjustments (Moore, Manyibe, Aref, et al. 2017; Moore, Manyibe, Sanders, et al. 2017). Moreover, federal research funding agencies use scientific output as one major criterion to decide who receives competitive R&D grants (Ginther et al., 2011b; Sutton et al., 2013, Yang et al., 2013).

Research productivity (i.e., number of proposals submitted or funded, peer-reviewed articles published or submitted for publication consideration, book chapter(s) or books published, and presentations made at conferences/meetings) increased among Fellows at all minority-serving institutions participating in the Academy intervention. Specifically, they developed eight peer-reviewed publications (19 co-authorships) and made seventeen different research presentations at national and international conferences. All publications and presentations focused on disability, rehabilitation, and/or health topics related to traditionally underrepresented racial and ethnic groups.

Additionally, participating institutions made seven disability/health and rehabilitation related research proposal submittals to NIDILRR and other federal funding agencies. Of these proposals, Academy Fellows at Mercy College won, for the first time in their career, a competitive three-year

$600,000 NIDILRR Field Initiated Project grant. The goal of this research project entitled "*Adolescents with Lupus: The Impact of Patient/Provider Discordance, Depression, Cognition, and Language"* was to evaluate discordance in the relationship between adolescent patient/provider global assessments of disease activity using a longitudinal mixed-method design. The Fellow research team's success in winning this award provides a clear and compelling example that highlights IRCBIM as a promising framework for building disability/health and rehabilitation research capacity at minority-serving institutions.

Recommendations

2.1: Minority-serving institution leaders should support the development of formal mentorship programs on their campuses that nurture, support, and develop the research talent. A "talented tenth" approach (Du Bois, 1903; Ellis, 2011) whereby the most capable early-career faculty scholars could be encouraged to work with seasoned researchers within as well as across-universities to further develop their research skill sets (e.g., methodology and grantsmanship). Administrators might consider leveraging available resources by having these faculty scholars participate in current federally-funded initiatives that mentor and/or train the talent such as the LU-RRTC, and others.

2.2: Minority-serving institution leaders should offer incentives to tenured and tenure-track faculty scholars designed to encourage them to pursue and obtain extramural grant funding, contribute to the development and sustainability of a culture that values R&D and scientific productivity, and attracts and retains the talent. We recommend a mixture of monetary (e.g., salary raises, travel funding, paid research assistants) and non-monetary incentives (e.g., reducing teaching load, providing adequate office space, and providing additional credit or value toward tenure and promotion).

2.3: Minority-serving institution administrators should develop and implement new policies that encourage innovative practices designed to stimulate scientific productivity among faculty members. The goal would be to create a new research synergy through such initiatives within the institution's culture; achieving the buy-in from both the academic and research divisions/departments to achieve strategic research production goals (e.g., amount of grants funded on campus, number of refereed journal articles published by faculty).

2.4: Minority-serving institution leaders should provide protected time to faculty members interested in conducting rigorous R&D activities. As a practical matter, administrators might consider prioritizing faculty scholars based on momentum and positioning; selecting those with the greatest promise in research grants procurement and refereed journal publications to benefit first from time protection initiatives.

2.5: Minority-serving institutions in partnership with NIDILRR and other federal research agencies (i.e., NIH, Agency for Healthcare Research and Quality [AHRQ], and National Science Foundation [NSF]) should facilitate a reward mechanism for early-career

investigators or new faculty members at minority-serving institutions to incentivize their full engagement early in robust, rigorous disability/health and rehabilitation research.

2.6: Researchers should conduct studies that examine federally-sponsored research centers based at minority-serving institutions to highlight their positive impacts and challenges they face in advancing the minority disability/rehabilitation and health science literature.

FINDING 3
Research Leadership Skills Increased Among Academy Fellows

The IRCBIM considers the ability to lead a research team as an important aspect of research capacity building at minority-serving institutions. These institutions need scientific leaders to help provide strategic research vision, mentor the next generation of leaders, and use knowledge translation strategies to inform policy and practice (Moore et al., 2012). The rapid demographic shifts in the faculty scholar cadre (i.e., increase in faculty scholars of color including those from different countries) occurring in the higher education system (Manyibe et al., 2013), and the globalization of the research enterprise (e.g., more research conducted with international partners) also call for well-trained investigators to lead diverse multidisciplinary and/or transdisciplinary research teams in finding solutions to complex disability/health and rehabilitation issues.

Overall, quantitative and qualitative results showed that Fellows in the Academy increased their research leadership skills, which included relationship building, negotiation, problem solving, initiation, cultural sensitivity, and communication. Academy Fellows noted that the skills they gained would help them lead research teams, develop collaborations, and establish networks. This finding is particularly welcomed because the current supply of investigators at minority-serving institutions leading federally-sponsored R&D projects and available to mentor early-career investigators is insufficient. There is a need for a critical mass of well-trained researchers of color available to provide research leadership in answering the large questions that are of interest to policy makers and strategists, practitioners, disability advocates, individuals with disabilities and their family members, and other stakeholders.

Recommendations

3.1: Faculty members should exhibit research leadership and advocate for reduced teaching loads and student advising and administrative responsibilities to enable them to devote adequate time to research and research skill building activities such as mentorship, grant writing, and manuscript development trainings. This is especially critical for early-career investigators, who aspire to become research leaders.

3.2: Faculty members should learn and implement innovative strategies that help them achieve greater balance between research, teaching (especially redundancy of topics), service, administrative, and family responsibilities.

3.3: Faculty members should participate in Communities of Practice that focus on learning and exchanging information and knowledge related to innovative approaches to improving disability/health and rehabilitation outcomes and experiences among individuals with

disabilities from minority racial and ethnic backgrounds. Faculty members can help lead these communities in learning innovative ways of integrating research processes into the culture of communities of color and minority serving institutions.

3.4: Faculty members should avoid working in silos and instead work collaboratively on research projects such as grant writing and manuscript development because such team-based opportunities augment the development of research leadership competencies.

3.5: Research mentorship programs should provide substantial opportunities for mentees to develop their leadership skills such as leading multidisciplinary research teams and participating in grant management meetings.

3.6: NIDILRR, NIH and other public and private research funding agencies should develop and implement mechanisms for including representatives from minority-serving institutions on boards, taskforces, and providing them with other opportunities for research leadership development.

FINDING 4
Faculty Scholars' Research Skills and Knowledge Increased

The advancement of minority disability/health and rehabilitation science depends largely on having highly knowledgeable and skilled researchers with competencies in methodologies, knowledge translation, grant writing, communication and leadership, and other attributes. These researchers play an important role in developing service interventions and models, designing evaluation measurement instruments, collecting and analyzing data, interpreting results, and eventually translating findings to inform policy and practice, and develop assistive technology innovations. They not only play a significant part in influencing the kind of strategies used to achieve research goals, but also how resources are allocated and evaluated. Moreover, because of the increased demand for evidence-based interventions and data-driven decision-making (DDDM), these investigators will continue to shape the scholarly discourse. Competent researchers are thus needed to ensure that the R&D enterprise not only generates new knowledge and products, but is also useful in solving complex societal problems with cultural nuances. Consequently, there is a strong need to increase research knowledge and skills among faculty scholars at minority-serving institutions to ensure their contributions toward meaningfully advancing the science and literature and scientific workforce diversity imperatives.

The analysis of quantitative and qualitative data garnered from faculty scholars (i.e., assistant, associate, and full-professors) participating in IRCBIM across disability/health and/or rehabilitation areas indicated that their research skills (i.e., methodology and grant-writing abilities) and knowledge increased. For instance, the results showed that these scholars' ability to design quantitative and qualitative research, which is a critical aspect of the research process, improved over the course of model implementation. In addition, they felt that engaging in research activities such as grant writing and manuscript development trainings not only increased their research knowledge, but also shaped their character, attitudes toward research, and scholarly engagements.

All stakeholders involved (i.e., Fellows, mentors, school deans, administrators/staff, and students) expressed the importance of developing research skills among faculty scholars. A critical mass of these individuals acquiring new research knowledge and skills could lead to a paradigm shift in the way R&D resources are located, possibly catapulting some of these institutions into the league of frontier research institutions. More importantly, a critical mass of well-trained researchers at these institutions could help to improve rehabilitation and health outcomes among people of color with disabilities.

Recommendations

4.1: NIDILRR should provide a funding supplement to the "National Flagship LU-RRTC" that has expertise and a proven track record in successfully carrying out activities (i.e., methodology and grant-writing skills) aimed at enhancing faculty scholars' research skills through methodology and grant writing training. This funding supplement could facilitate a massive expansion in the Center's mentoring and training agenda targeting these members of the professoriate, including academicians with disabilities who are also people of color.

4.2: NIDILRR should fund return-on-investment studies to generate empirical data-driven results that shed light on the economic advantages of research capacity building investments at minority-serving institutions important to policy makers and taxpayers. The economic impacts of federal research funding, or the lack thereof, on these under-resourced institutions and surrounding economically marginalized communities of color are relatively unknown.

4.3: Researchers should conduct longitudinal studies to determine the nature and importance of collaborations and networks that position junior-level faculty scholars and early-career investigators to become future disability/health and rehabilitation research leaders of color in the field.

4.4: Researchers should investigate the intersectionality of research capacity building interest/inclination and faculty scholars' gender at minority-serving institutions. We believe that these types of empirical studies (i.e., inquiries that examine specific cultural dimensions and the role they play in interest/inclination toward minority research capacity building) would enrich the existing body of knowledge and help to inform practices, policies, and R&D.

FINDING 5
Formal Research Mentorship Benefits Fellows, Mentors, and Institutions

The Peer-to-Peer Mentor Research Team Model intervention (i.e., the Academy) directly or indirectly benefited all parties engaged in the process (i.e., Academy Fellows, mentors, students, and institutions). For instance, Fellows felt that they acquired new knowledge and research skills, expanded their social networks, became more aware about research opportunities, increased their confidence in research abilities, and enhanced their career prospects. In addition, Fellows who succeeded in grant writing and manuscript development noted that they brought prestige and resources for infrastructure

development to their institutions and academic departments. They also indicated that the knowledge gained would inform their teaching.

Consistent with extant literature (Blood et al., 2012; Chen & Lou, 2014; Colo´n-Emeric et al., 2012; Nick et al., 2012), the results indicated that benefits associated with being a mentor included increased productivity, professional networking, and enhanced recognition. This literature has also noted that mentors develop and improve their interpersonal, coaching, and listening skills, among others. Interestingly, faculty scholars who do not have mentors seldom receive career development advice or help with developing research skills (Moore et al., 2012; Rodríguez et al., 2014); hence seldom participate in research or are promoted. Participants called for more mentorship opportunities that could be made available to faculty scholars and students.

Recommendations

- **5.1:** Faculty members at minority-serving institutions should seek out and participate in formal research mentorship programs (e.g., Academy) to build their research skills (i.e., research methodology and grant writing) and knowledge.
- **5.2:** Faculty members should actively participate in research skill and professional development trainings within and external to their campuses. For example, the LU-RRTC periodically offers grant writing, manuscript development, and research methods webinars and trainings open to minority-serving institution faculty scholars and students.
- **5.3:** Minority-serving institutional leadership should encourage faculty scholars to mentor undergraduate and graduate students by including them in ongoing research projects. A growing body of evidence shows that involving students at these institutions in research early is a strategy for building the pipeline for creating a diversified scientific workforce.
- **5.4:** NIDILRR and other research funders should support additional studies at the exploration stage-of-research that examine new and emerging research mentorship approaches at minority-serving institutions to help generate hypotheses about what works and merits confirmation in more complex studies (e.g., well-matched comparison-group studies).
- **5.5:** Researchers should continue field-testing the Academy mentoring model to assess and identify features that are more beneficial for building the capacity of faculty members based at minority-serving institutions to conduct rigorous scientific studies.
- **5.6:** Minority-serving institutions should develop and implement incentives that attract and retain research leaders to their campuses to serve as mentors and role models. Such leaders, based on a mutually agreed structure, should be required to dedicate a percentage of their time to mentor early-career investigators.
- **5.7:** Minority-serving institution leaders should develop and implement an "Innovative Undergraduate Research Mentoring by a Faculty Award". This award would recognize excellence in undergraduate research mentoring by a faculty member. Implementing this award will signal that the leadership is committed to improving the R&D enterprise within the context of their campuses and is committed to commencing that pipeline early on among undergraduate students.

FINDING 6
IRCBIM Contributed to Strengthening Research Infrastructures

Strengthening research infrastructure at the five participating institutions was a major objective of IRCBIM. Such research support systems (e.g., libraries, databases, research centers, high speed communication networks) make it possible for investigators to conduct high-quality, rigorous R&D for the generation of new knowledge and technology (National Academies of Sciences, Engineering, and Medicine, 2019) aimed at improving disability/health and rehabilitation outcomes and experiences among people of color with disabilities (Moore et al., 2012). An effective technology infrastructure, for example, enhances communication, collaboration and networking among researchers.

Within the higher education context, such advanced and well maintained systems enable institutions and individuals (e.g., faculty, staff, and students) to increase scientific performance. Overall, our quantitative and qualitative derived findings indicated that the model contributed to the improvement of research infrastructures (e.g., research strategic planning and office of sponsored programs' effectiveness) at participating institutions. However, participants also felt that there was negative change (i.e., perspectives on resource access levels decreased post-intervention) in institutional technological resources available to them, such as computers and research software (e.g., SPSS, SAS, and NVivo). This finding suggests that IRCBIM may have catalyzed a research culture change that resulted in increased demand for such technological resources.

Recommendations

6.1: NIDILRR and other federal funding agencies, in collaboration with leaders at minority-serving institutions, should invest in technological resources that drive the R&D enterprise to help meet the increasing demand for these assets.

6.2: NIDILRR, NIH and other federal agencies should commission a joint feasibility study on establishing a national research infrastructure development investment fund targeting minority-serving institutions. The study should generate recommendations on innovative ways to implement comprehensive strategic plans designed to provide a roadmap for creating missing R&D support systems at these institutions as well as strengthen and update existing ones.

6.3: NIDILRR and other federal agencies should commission longitudinal studies that examine IRCBIM's individual, institutional, and systems levels impacts. These inquiries are needed to provide empirical information critical to increasing the field's understanding of the model's long-term benefits. They could provide insight about culture shifts at minority-serving institutions as well as emerging institutional capacity-building and individual research skill enhancement needs.

6.4: Minority-serving institution leaders should put in place mechanisms for managing the processes by which they recruit, develop, and retain research administrative units' (i.e., office of sponsored programs) human capital.

6.5: Minority-serving institution leaders should work in partnership with federal agencies that fund disability/health and rehabilitation research (e.g., NIDILRR, NIH) to identify

fiscal mechanisms that support the professional development of institutional research administrators, leaders, and staff.

6.6: Emerging capacity building models should include a focus on developing human capital (i.e., the talents and competencies) responsible for ensuring the effective functioning of research administrative units such as the office of sponsored programs, institutional review boards, and the office of comptroller, which directly influences R&D outcomes at academic institutions.

6.7: Researchers should conduct studies that develop a profile of disability/health and rehabilitation research centers at minority-serving institutions, detailing annual flow of R&D funds from each federal agency. This information could make it possible to evaluate the impact of Presidential Executive Orders (e.g., Presidential Executive Order 13779- an initiative to promote excellence and innovation at HBCUs), which require federal agencies to prepare annual plans describing efforts to strengthen the capacity and competitiveness of minority-serving institutions.

FINDING 7
Overall Research Culture Improved

Institutional research culture (i.e., the implicit and explicit value placed on participating in scientific knowledge creation and disseminating scientific research at the institutional and unit levels) not only drives the adoption and implementation of innovations, but also provides clear guidance about acceptable research behaviors within the organization (Hanover Research, 2014). In addition, a culture of research yields higher motivation to conduct R&D, which in turn leads to greater research productivity, and enhanced research infrastructure. In the current study, we conceive research culture as the degree of emphasis that a minority-serving institution puts on research, which may be reflected in mission statements, institutional and academic unit strategic plans, research support units (e.g., office of sponsored programs, facilities (e.g., office space), and faculty hiring and promotion processes (Moore, Manyibe, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017). Our findings suggest that research culture at participating institutions increased.

Recommendations

7.1: NIDILRR, NIH and other federal agencies should intentionally fund a critical mass of grant applicants with merit (i.e., fundable scores) from minority-serving institutions, especially those institutions that have been historically underrepresented across the federal funding landscape, as a demonstration that they value the power of diversity.

7.2: Minority-serving institution leaders should develop and implement institutional research policies that support and promote research culture. To actualize a research vision, these institutions must develop and implement long-range strategic plans that clearly align with their mission, goals, objectives, and resources along with R&D expectations.

7.3: Minority-serving institution leaders should invest in ongoing R&D (i.e., activities designed to advance and sustain research capabilities) to provide opportunities for early-career faculty

members and students to develop their research while simultaneously making meaningful contributions to the disability/health and rehabilitation scientific literature.

7.4: Minority-serving institution leaders should financially support faculty scholars at their respective institutions, especially TCUs, who are pursuing graduate degrees. For example, institutional leaders and funding agencies can explore ways to provide financial support to faculty at TCUs (e.g., programs where faculty advanced degree educational costs are subsidized by the institution in exchange for payback in the form of time worked at the institution post-degree) who are pursuing graduate degrees in disability/health and rehabilitation programs.

7.5: Minority-serving institution leaders should work with their respective communities and their disability leaders and advocates to develop trusting relationships and partnerships, which are critical not only to research participant recruitment, but also to empowering communities of color as co-researchers.

FINDING 8
Capable Mentors Play an Important Role in Making the Mentorship Experience Successful

Capable and generous mentors play a plethora of important roles in the development of mentees. For example, they help to enhance junior faculty scholars' and early-career researchers' scientific skills, which lead to increased peer reviewed publications and grant submissions. In addition, mentors help mentees develop a constellation of professional and personal networks that are essential to their development (Beech et al., 2013). The Academy Fellows reported that it is very difficult to find mentors who have obtained and managed research grants from federal research agencies. Fellows singled out the experience, knowledge and skills, willingness to share resources, support they received, and the style of leadership as some of the qualities they greatly appreciated about their mentors.

Recommendations

8.1: Faculty scholars should seek and establish relationships with multiple seasoned mentors (e.g., comprised of content experts, multicultural specialists, methodologists, and statisticians) who can help guide their research agendas and support them at various stages during their development as researchers.

8.2: Research should consider examining relationships between mentees/Fellows and mentors and describe their experiences, especially as it relates to research skill development and success in developing peer-reviewed articles and procuring federal grants to undertake rigorous R&D projects.

8.3: Research should examine and identify the ideal philosophical orientation toward the mentoring process that is idyllic for mentees who are members of underserved and minority groups. For example, mentors that embrace the philosophy to prepare mentees who can surpass the mentors' achievements are probably best suited for working with protégés at minority-serving institutions.

8.4: Researchers should investigate long-term impacts of formal mentoring relationships. Such studies might examine whether mentorship experiences influence Fellows' (mentees) decisions to seek full-time faculty positions at minority-serving institutions. They could also examine whether Fellows continue to conduct research that focus on persons of color with disabilities across their career paths.

FINDING 9
Participants Perceived the Model as a Strategy for Creating a Pipeline to Diversify the Scientific Workforce

Minority-serving institutions possess a remarkable wealth of culturally competent expertise as they attract a large cadre of minority faculty scholars. They also educate many students of color and from low-income backgrounds. As such, these institutions are uniquely positioned to drive culturally competent R&D and serve as a training pipeline for scientific workforce diversity endeavors. Increasing the number of researchers at these institutions could encourage greater participation among people of color with disabilities in disability/health and rehabilitation research (George et al., 2014) and lead to robust scientific methodologies affecting these populations (Manyibe, Moore, Aref, et al., 2017; Moore, Manyibe, Aref, et al., 2017). Unsurprisingly, the study participants felt that building the capacity at minority-serving institutions through IRCBIM represented an innovative pipeline strategy for diversifying the scientific workforce. This cadre of well-trained researchers will have the requisite skills to conduct rigorous R&D aimed at improving the lives of people of color with disabilities. In addition, participants lamented the current dearth of researchers of color available to give voice to issues that may be unique to these populations and communities, and indeed the institutions that serve them.

Recommendations

9.12: NIDILRR and other federal agencies should conceptualize minority-serving institutions as strategically positioned to serve as avenues for diversifying the scientific workforce. To enhance intramural agency capacity to more effectively serve marginalized racial and ethnic disability populations across the nation, NIDILRR should strongly consider developing an internal Fellowship Program in partnership with HBCUs that promotes diversity within the agency's project officer and leadership cadre; ensuring that the voices of those who are often overlooked are heard around the decision-making table.

9.12: NIDILRR and other federal agencies should consider increasing their investments in early intervention strategies designed to stimulate interest in disability/health and rehabilitation research and scientific careers among minority students, including those with disabilities, at the primary, secondary (middle and high school) and undergraduate college levels. Because research is a learned behavior, which can begin as early as elementary school and enhances as individual's progress through the academic and professional ladder, these agencies should work in partnership with minority-serving institutions to develop and implement such interventions. The McNair Scholars Program, which is designed to socialize minority students into

disability and health research careers before college or graduate study, could serve as a potential model, among others.

9.13: Institutional leaders should consider developing and implementing new disability/health and rehabilitation graduate level academic programs that will help to prepare the next generation of minority disability researchers and capacity building experts.

9.14: NIDILRR, NIH and other federal research funding agencies should commission a study to determine short and long-term scientific workforce diversity needs and make recommendations on ways to collaborate with minority-serving institutions as partners for implementation.

FINDING 10
Increased Collaboration and Networking Opportunities

There is widespread agreement that collaboration (i.e., researchers and/or institutions working in partnership to produce new scientific knowledge) is a driver of research excellence (National Research Council, 2015; Rosen-Reynoso et al., 2017). For example, cooperation between institutions or researchers facilitates information exchange critical to the success of research projects. In addition, researchers of color working collaboratively bring different perspectives, hence generating new knowledge that can be used to solve complex disability, rehabilitation, and health questions. Collaboration, especially in the context of minority-serving institutions, is even more critical as it facilitates the sharing of limited resources such as webinars on research topics, finance, data and databases, and statistical software (Rosen-Reynoso et al., 2017). Our quantitative and qualitative evaluation results suggested an increase in collaboration at the institutional and individual levels. In addition, participants reported increased research networks, and identified benefits associated with collaboration and networking such as identifying research ideas, social support, learning, and information sharing.

Recommendations

10.1: NIDILRR and other federal agencies should create additional opportunities for faculty scholars, students, and staff affiliated with minority-serving institutions to establish networks with successful researchers, federal agency personnel, and other stakeholders who drive the R&D enterprise. Because the position one occupies in a social network plays a critical role in shaping behaviors, these agencies should make *intentional efforts* to ensure that faculty members, students, and staff at these institutions are not only connected—but more importantly that they occupy central positions that allow them to influence decisions.

10.2: Minority-serving institutions should establish and cultivate close research collaborations with disability organizations such as the National Coalition of Disability, National Center for Disabilities, and others to address new and emerging issues worthy of scientific examination. The role of researchers at minority-serving institutions in such collaborations warrants clarification and updating to address the emerging needs of a diverse society.

10.3: NIDILRR in partnership with minority-serving institution faculty scholars, students and staff, and other research funders (public and private) should develop, finance, and sustain a research capacity building and infrastructure development collaborative network to establish connections and information exchanges relevant to the context (e.g., cultural, policy, and needs) where these institutions operate.

10.4: Minority-serving institution mid-management administrators (e.g., departmental heads and program chairs) should work with faculty scholars to develop a climate within their units that fosters a culture of collegiality.

FINDING 11
Increased Awareness about NIDILRR and Other Federal Agencies that Fund Research and Development

Awareness enhancement is one of the most effective strategies for narrowing the knowledge gap (Yee, 2015). As a result, many federal research agencies (e.g., NIDILRR) and private foundations have developed comprehensive communication strategies designed to create awareness about their services and/or products. One strategy NIDILRR uses to create awareness about its services is through its grantees. Our findings indicated that IRCBIM created awareness at the five participating institutions about NIDILRR and other federal agencies (e.g., NIH) that fund disability/health and rehabilitation R&D. Because of this attentiveness, additional minority-serving institutions and their affiliated scholars can be expected to compete for federal funding critical to their research agendas and research capacity building goals. In addition, our findings revealed that many faculty scholars, staff, and students were unaware about the existence and role of NIDILRR, NIH, and other federal agencies; did not know how to apply for funding at these agencies; and were unsure about the eligibility criteria. This may have contributed to limited disability/health and rehabilitation research proposal submissions, scientific publications, and innovations.

Recommendations

11.1: NIDILRR, NIH and other federal agency leaders should sponsor project officers' travel to minority-serving institution campuses to raise faculty scholars' and researchers' awareness of the need for reviewers as well as provide them information about competitive R&D grant mechanisms and related opportunities.

11.2: NIDILRR, NIH and other federal agency leaders should develop a comprehensive recruitment outreach plan to increase minority-serving institution investigators' participation on grant review panels, and to ensure that an appropriate representation of minority expert researchers participates on these panels. Methods of effective outreach to these institutions should be established with substantial input from key stakeholders (e.g., HBCU researchers, faculty members, and administrators).

11.3: NIDILRR should develop a paid "Minority-Serving Institution Fellows Program" for undergraduate, master's, or doctoral level students, including those with disabilities,

matriculating at HBCUs, HSIs, or TCUs interested in, and committed to developing careers in federal agencies with disability/health and/or rehabilitation foci. Under this program, Fellows should have the opportunity to work directly with NIDILRR senior staff, participate in NIDILRR network groups, get hands-on experience in grant-making processes through participation on a variety of essential assignments, and receive career mentorship. This program will contribute to NIDILRR's workforce diversity enhancement efforts.

FINDING 12
Research Capacity Building Challenges

Challenges faced when implementing research capacity building interventions often reflect a complex interaction between individual, institutional, and systemic factors. Capacity building experts and stakeholders such as host institutions and federal funding agencies must be cognizant of inherent challenges and develop mechanisms to address them when they arise. In this evaluation study, participants identified several challenges associated with implementing IRCBIM at their institutions that included: (a) lack of adequate experience working in multidisciplinary research teams, (b) time management, (c) scheduling conflicts, (d) understaffed research administrative units, (e) undesirable turnover among university administrators, staff, and faculty, (f) inadequate supply of capable mentors and role models, (h) limited peer-review opportunities, (i) inadequate research infrastructures, and (j) feelings that scholarship produced at minority-serving institutions was devalued.

In response to the Academy feature of IRCBIM implementation challenges, the LU-RRTC research team and ICI developed an elaborate monitoring plan. For example, the LU-RRTC research team met weekly in addition to meeting with ICI teams monthly to monitor and evaluate project progress. Mentors met with Fellows weekly to provide mentorship services as well as address issues that arose. The LU-RRTC research team also made visits to participating institutions and met university administrators, faculty, staff, and students face-to-face to listen to their concerns directly, exchange information, and address any issues. In addition, we communicated electronically with key stakeholders to respond to questions or provide information that facilitated the implementation process.

Recommendations

12.1: Mentors and mentees should work collaboratively to schedule meeting times in advance. In addition, the agenda, goals, and expectations for each meeting should be clear and shared in advance to ensure that all parties involved are prepared.

12.2: Mentors should use different meeting modalities such as face-to-face and teleconferencing to ensure greater flexibility and to accommodate the needs of participants. The use of technological software programs such as Zoom, GoToMeeting, Basecamp, Asana, and Tegrity can facilitate information sharing, manage projects, and enhance productivity.

12.3: Mentors should develop their cultural competency skills. Mentees at minority-serving institutions represent individuals from diverse cultural backgrounds. These relationships will require generous capable mentorship whereby mentees are provided with culturally

appropriate guidance and support in developing their research agendas. Mentors should consider contextual factors when working with these mentees such as family structures and obligations, traditions, religion, countries of origin norms, etc. These elements should be considered and learned about to develop a relationship of cultural reciprocity- where each mentor and mentee can learn from one another in how best to facilitate an excellent mentorship experience.

12.4: Mentors should make an intentional effort to provide a comprehensive learning support system that facilitates successful mentoring relationships. These supports may be cognitive (e.g., identifying research ideas), emotional (e.g., motivating and inspiring), social (e.g., providing advice on how to interact with research team members) or physical (e.g., providing research articles).

12.5: NIDILRR, NIH and other federal funding agencies should develop mechanisms that encourage the selection of grant reviewers from minority-serving institutions. Such actions could address perceptions that the grant review process favors predominantly White institutions (PWIs). One implication of Hoppe et al.'s (2019) finding on proposal topic importance (i.e., population focus versus microscopic focus) in explaining NIH R01 grant award racial discrepancies is the need for a diverse scientific reviewer pool. In order to address bias against disparity research as a topic, there is a dire need to bring minority researchers' perspectives on the significance of addressing rehabilitation and health inequity issues in the proposal assessment process.

12.6: NIDILRR, NIH and other federal funding agencies should conduct bi-annual evaluations designed to address underlying biases within the selection of grant expert/peer-reviewers from minority-serving institutions. Evaluation findings should be made available to the public to help create a culture of accountability as well as to make it possible to develop data-based interventions to address any identified biases.

12.7: NIDILRR and NIH leaders should increase the level of transparency of the grant peer-review process by publicly disclosing minority-serving institution faculty and racial/ethnic composite demographic data for review panels across specific competitions. This practice would ensure that faculty members at minority-serving institutions play an active role in the scientific peer review process.

12.8: NIDILRR, NIH, and other federal agencies should address their expectations for minority-serving institutions' proposal success. This is especially critical given that participants felt that the R&D community tends to devalue scientific knowledge generated at minority-serving institutions. Devaluing knowledge generated at minority-serving institutions can have several far-reaching negative psychological consequences at the individual and collective levels, which in turn may discourage individuals at these institutions from conducting meaningful research.

FINDING 13
Unmet Research Capacity Building and Infrastructure Development Needs

Minority-serving institutions often lack the requisite research infrastructure that efficiently promotes and facilitates research and innovation. Participants reported several unmet capacity building needs such as inadequate formal mentorship opportunities; inadequate supply of researchers and leaders of color, including those with disabilities available to serve as role models and/or mentors; and limited research infrastructure (e.g., obsolete technology and inadequate facilities) responsible for supporting a robust research culture and stimulating scientific productivity. The lack of adequate research support systems at these institutions poses significant scientific performance challenges, which ultimately derail research efforts to alleviate disability/health and rehabilitation disparities among people of color with disabilities.

The findings underscore the importance of providing customized technical assistance and consulting services aimed at developing new or enhancing existing research support systems. Federal agencies that are mandated to play a major role in providing funding that promotes scientific endeavors should develop innovative strategies that strengthen and/or build 21st century infrastructure at minority-serving institutions to support innovative R&D. Numerous reports and our experiences show that overcoming these challenges and making progress require increased and sustained resources, especially those assets procured through federal agency grant and cooperative agreement sponsorships.

Recommendations

13.1: NIDILRR and other federal agencies should fund the establishment of new undergraduate, masters, and doctoral (i.e., Ph.D.) level health and rehabilitation training programs at minority-serving institutions as part of its capacity building long-range strategy. These additional academic programs would help to build the training pipeline infrastructure and contribute to the diversification of the scientific workforce.

13.2: NIDILRR, as a key implementing agency of Section 21, should designate a significantly higher proportion of its annual budget exceeding the currently mandated 1% to minority-serving institution capacity building efforts. This action could help to ensure that a critical mass of these entities is developed to participate in R&D activities. NIDILRR is well-positioned to become a role model for other federal agencies on how to develop and sustain a stream of targeted research capacity building priorities implemented by minority-serving institutions as grantees.

13.3: NIDILRR should plant and subsequently cross-fertilize through funding new or sustained projects that grow out of the following mechanisms on the campuses of HBCUs and other minority-serving institutions: Advanced Rehabilitation Research Training [ARRT], Disability Rehabilitation Research Projects [DRRP], Field Initiated Projects [FIP], Rehabilitation Engineering Research Centers [RERC], Rehabilitation Research and Training Centers [RRTCs], Small Business Innovation Research [SBIR], and the Switzer Research Fellowship Program.

13.4: The U.S. Congress should amend the 1973 Rehabilitation Act (Section 21 Mandate enacted in 1992) to significantly increase NIDILRR's required annual budget designation of only 1% to minority-serving institutions to 15%. In light of the devastating effects of pandemics such as COVID-19 on people of color and disproportionate rate of disability and incidence of pre-existing health conditions (i.e., diabetes, heart disease, high blood pressure) due to social determinants of health, the agency should be mandated to devote a significantly higher proportion of its funding to position these institutions to become rapid R&D responders to future crises. To offset potential budget hardships on the agency, the Congress should increase overall funding to NIDILRR through subsequent annual budget appropriations. Influential disability associations, advocates and networks, and Congressional leaders on the Republican and Democratic sides could work together as "Champions" for this Section 21 mandate amendment.

13.5: NIDILRR, NIH and other federal agencies (e.g., NSF) should consider establishing a National Research Infrastructure Fund targeting minority-serving institutions. The fund would focus on strengthening research ecosystems at these institutions. The establishment would not only align with Presidential Executive Orders that have consistently sought to promote excellence and innovation at minority-serving institutions, but would also be congruent with national scientific, educational, security, and socioeconomic development policy goals and objectives.

13.6: NIDILRR should develop a new "racial equity" outcome domain. This novel area would promote improved outcomes among people of color with disabilities that cut across the agency's current three inter-related domains of employment, health and function, and community living and participation. As a component of this, NIDILRR would fund translational research to (a) alleviate differential rehabilitation and health experiences and outcomes among members of this target population and (b) build the capacity of HBCUs and other minority-serving institutions to participate in R&D. Research and capacity building activities would support the goal of mitigating R&D funding disparities between these under-resourced institutions and PWIs.

Conclusion

New multi-level research capacity building strategies are needed to empower minority-serving institutions to optimally participate in generating knowledge that can be translated into new interventions and advanced technologies resulting in improved rehabilitation and health outcomes and experiences among people of color with disabilities. The current findings support IRCBIM as one such promising multi-dimensional institutional research capacity building strategy. This current evaluation of the model across the five participating HBCUs, HSIs, and TCU will lead to subsequent refined national efforts aimed at assessing its longitudinal benefits that help extensively address Section 21; thereby continuing to level the playing field for theses under-resourced institutions to compete for funding across NIDILRR's, NIH's and other federal agencies' investment portfolios. Whilst the "Matthew effect"

(Merton, 1968) principal greatly advantages PWI-based investigators (i.e., accruing of large increments of peer recognition and research grant dollars leads to more grantsmanship success) as opposed to those at minority-serving institutions in federally-sponsored R&D performance, as one participant clearly observed; "I think that when you think about the availability of resources at PWIs, this effort [IRCBIM] attempts to, you know, level the playing field." This observation corroborates well documented evidence attesting that minority-serving institutions seldom receive their fair share of R&D resources.

The need to strengthen research capacity at minority-serving institutions is more urgent than ever; especially in the current COVID-19 pandemic context where individuals with disabilities from communities of color are disproportionately impacted. These organizations, like other higher education institutions, are under extreme pressure to find innovative and efficient ways to respond to local, national, and global challenges. For example, they are now expected to substantially contribute to the nation's college completion goals, diversify their revenue streams and significantly engage in the scientific knowledge production enterprise. Because of these changing expectations, they have attracted renewed attention. Not surprisingly, a growing number of higher education stakeholders, policy experts, and funders advocate for these under-resourced institutions and their affiliated scholars to play a more prominent role in disability/health and rehabilitation R&D. NIDILRR and other federal research agencies should work in partnership with these institutions to develop and implement new capacity building interventions that promote a culture of research. Institutional culture not only drives creativity and the adoption and implementation of scientific innovations, but also provides clear guidance about acceptable research behaviors within the organization. In addition, a culture of research yields higher motivation to apply the scientific paradigm for solving complex societal problems, which in turn could lead to enhance institutional research infrastructure and scientific productivity.

Introduction

Minority-serving institutions in the United States (U.S.) channel the lived experiences of people, populations, and communities of color (Gasman & Conrad, 2013; Moore, Manyibe, Aref, et al., 2017), and constitute a crucial component of the country's post-secondary educational infrastructure. These institutions, as defined in section 21 of the 1998 Rehabilitation Act Amendments (Public Law 93-112), are historically Black colleges or universities (HBCUs), Hispanic-serving institutions (HSIs), American Indian tribal colleges or universities (TCUs), or another institution of higher education whose minority student enrollment is at least 50% (U.S. Department of Education, 2013). They play a critical multi-faceted role within an ever-evolving, complex, and challenging higher education landscape, and the global social, economic, and cultural system increasingly driven by the need for new scientific knowledge and technological advancements and innovations (Gasman, 2010; Manyibe et al., 2015; Moore, Manyibe, Sanders, et al. 2017; Rogers, 2012). Collectively, they serve as a key pillar to the nation's college completion goals and global economic competitiveness (Moore et al., 2012). Minority-serving institutions also serve a distinct role in educating students from low-income families. In addition, their economic footprint is quite substantial. A recent report—*HBCUs Make America Strong: The Positive Economic Impact of Historically Black Colleges and Universities* indicated that HBCUs generate approximately $15 billion in economic impact annually (Humphreys, 2017; Saunders & Nagle, 2018). These contributions are even more critical because many are located in economically under-resourced communities, which are in dire need of job creation opportunities that lead to improved quality of life and sustainable development.

Although minority-serving institutions vary substantially on metrics such as the number of students enrolled and faculty members employed, classification and mission, they maintain the common goal of meeting the needs of the populations and communities they serve (Cunningham et al., 2014; Rosen-Reynoso et al., 2017; Saunders & Nagle, 2018). Together, they enroll approximately 4.8 million students, or 30% of all undergraduates in U.S. institutions of higher education (de Brey et al., 2019; Espinosa et al., 2017; National Academies of Sciences, Engineering, and Medicine, 2019). Remarkably, these institutions educate over 20% of all undergraduate students of color. In the academic year 2016-2017, HBCUs conferred some 49,500 degrees, and Hispanic-serving institutions conferred some 185,100 degrees to Latinx students. During the same period, about 1,300 associate's degrees and 300 bachelor's degrees were conferred to American Indian/Alaska Native students by TCUs (de Brey et al., 2019).

Increasingly, policymakers and strategists, researchers, scholars, community leaders, and other social and economic development stakeholders identify minority-serving institutions as fundamental to addressing a plethora of complex issues that face people and communities of color (Cunningham et al., 2014; Flores & Park, 2013; Gasman, 2010; Perna, et al., 2010). Within the disability/health and field, they are well-positioned to lead culturally competent research and development (hereafter referred to as R&D) efforts that inform policy decisions at the state and national levels (Zea & Bowleg, 2016), as well as create valuable information for designing culturally appropriate service interventions and

technological innovations aimed at eliminating persisting disparities (Manyibe, Moore, Wang, et al., 2017; Moore, Wang, Davis, et al., 2017). Cultural competence in R&D is defined as "the ability of individual investigators or a research team to provide high-quality research that appropriately responds to the culture and diversity of a population when developing research ideas, conducting research, and exploring the applicability of research findings" (Harvard Catalyst, 2010, p. 6).

Because of the unique role these institutions play in the U.S. higher education landscape, several federal agencies that sponsor disability/health and rehabilitation R&D (i.e., National Institute on Disability, Independent Living, and Rehabilitation Research [NIDILRR], National Institutes of Health [NIH], Agency for Healthcare Research and Quality [AHRQ] and National Science Foundation [NSF]) increasingly recognize them as indispensable partners in achieving their intermediate and long-range strategic policy objectives (Moore et al., 2015; Manyibe, Moore, Aref, et al., 2017). This recognition underscores the need to increase the supply of well-trained researchers at minority-serving institutions who can help to ensure that cultural contextual factors are appropriately considered across the applied research paradigm (i.e., identification of the problem, research question and hypotheses development, data collection and analysis, interpretation of findings, and translation of new knowledge from the bench into the hands of the people who can put the information or technology to practical use). Unfortunately, many of these under-resourced institutions face structural obstacles that limit their ability to participate optimally in R&D priorities that advance the science and literature. Such barriers include, but are not limited to, chronic federal research agency underinvestment, lack of or dilapidated infrastructure, limited revenue streams, inadequate formal mentoring programs, and poor access to current research findings (Cunningham et al., 2014; Moore, Aref, Manyibe, et al., 2016). Additionally, their faculty members interested in pursuing an R&D agenda often experience a plethora of systemic challenges such as heavy teaching loads, unavailability of seasoned and generous mentors and role models, inefficient institutional review board (IRB) and sponsored programs office operations, lack of supportive administrative cultures, inadequate research dissemination/ presentation travel funds, and insufficient library resources and subscriptions (Manyibe et al., 2015; Moore, Manyibe, Sanders, et al., 2017). Expectedly, such barriers are context-dependent, which has led many scholars and higher education experts to call for rigorous new research capacity building strategies and models tailored to institutions' context and specified obstacles experienced (Bernal & Ortiz-Torres, 2009; Epps & Guidry, 2009; Moore, Aref, Manyibe, et al., 2016).

Shifting Paradigm Guiding the Research Capacity Building Science

According to Lo and Porath (2017), paradigm shifts involve radical changes in how a field conceptualizes itself and brings disruption to established community norms. The research capacity building field is not only evolving in the areas of disability/health and rehabilitation, but is also experiencing a dynamic paradigm transfer, which promotes a clearer connection between minority-serving institutions and the advancement of the science and empirical-based literature. This vibrant re-shaping of the scholarly discourse, as shown in Table 1, has materialized various emerging and promising models aimed at building these institutions' disability/health and rehabilitation research

capacity and stimulating their R&D performance (Manyibe et al., 2015; Moore, Manyibe, Aref, et al. 2017; Moore, Manyibe, Sanders, et al. 2017). To understand this change, one must first examine the existing dominant paradigm (hereafter referred to as the traditional or old paradigm). The traditional paradigm, its roots traced back to the European model of research-intensive universities (Arai et al., 2007), has dominated the research capacity building field over the past several decades. In the U.S., this exemplar assumes that high-quality R&D should be led by research-intensive universities (e.g., John Hopkins, Stanford University, the University of Chicago), which are mostly predominantly White institutions ([PWIs] Manyibe et al., 2015; Moore et al., 2012; Ofili et al., 2013). This standard has tremendously influenced the way universities are classified and/or ranked. Highly ranked institutions, often PWIs, tend to receive a disproportionate amount of federal R&D investments from federal agencies, commercial businesses, and non-profit charities such as Melinda Gates Foundation and the Rockefeller Foundation. Unfortunately, minority-serving institutions that have been historically underrepresented across the federal research agency landscape are not well ranked, and therefore less likely to receive R&D funding to help build their capacities to reflect 21st - century demands.

The old paradigm also conceives many minority-serving institutions as teaching institutions while assuming that they do not possess adequate human and intellectual capital and institutional infrastructure to conduct high-quality, rigorous R&D. Not surprising, this way of thinking narrowly focuses on illuminating barriers at these institutions, ignores their unique capabilities, and devalues the capacities and potential of their faculty members, researchers, and students. Consequently, federally-sponsored research capacity building efforts have (a) mostly focused on building the research skills of PWI-based early-career investigators and students, (b) centered on funding independent PWI-based investigators, (c) directly or indirectly required PWI-based researchers, who are mostly White, to mentor minority-serving institution-based early-career investigators, and (d) often require minority-serving institutions and their affiliated investigators to serve as sub-contractors as opposed to leading "big" research projects. A plethora of classic examples of this old standard's influence is evident in federal agencies' policy initiatives such as a recent National Institutes of Health (NIH) Institutional Research and Academic Career Development Awards (IRACDA) (K12) request for proposals (RFP). This opportunity noticeably stipulated that the lead applicant must not only be a research-intensive university, but also must serve as the primary site of the post-doctoral research experience. Many minority-serving institutions have been historically underrepresented in the federal research arena, and thus lack the requisite research infrastructure to meet this standard. Consequently, this stipulation excludes an overwhelming majority of these institutions that could benefit substantially from participation.

To be sure, the traditional paradigm is relevant to some contexts, and focusing investments on mostly PWIs may have improved their scientific performance. Most important, however, this old standard has failed many minority-serving institutions in two main ways. First, it has fallen short in bringing about meaningful change in the way policymakers and strategists, researchers, and practitioners address disability/health and rehabilitation disparities. These persistent inequities (Erickson, et al., 2012; Moore & Wang, 2016; Moore et al., 2015) clearly indicate that the old paradigm has not succeeded in

developing a critical mass of well-trained researchers who have the capacity, fortitude, and passion for conducting culturally competent R&D that provides answers to complex questions, oftentimes with historical and cultural nuances that key stakeholders and the field need to be addressed.

TABLE 1. Traditional Paradigm Focus Areas Versus Emerging Paradigm Focus Areas

Traditional Paradigm	Emerging Paradigm Shift
A focus on institutional internal barriers at minority-serving institutions.	Focuses on strengthening research capacity of minority-serving institutions.
Minority-serving institutions and affiliated scholars conceive themselves as teaching institutions hence lack research self-efficacy.	A consciousness shift where minority-serving institutions and affiliated scholars conceive themselves as research and teaching institutions.
Hierarchical, top-down relationships characterize the interaction of the protégé-mentor relationship.	Focuses on team-based peer-to-peer multiple mentor approaches.
Research capacity-building strategies focus on enhancing the skills of individual scholars.	Research capacity building strategies focus on individual skills enhancement and infrastructure improvement.
Promotes PWIs and affiliated researchers as leaders in scientific collaborations.	Focuses on developing empowering collaborations where minority-serving institutions and affiliated scholars lead scientific collaborations.
Focuses on Eurocentric positivist research methodologies.	Promotes the value of critical multiplism.

Second, the traditional paradigm has not succeeded in enhancing the capacity of minority-serving institutions to participate in cutting-edge federally-funded R&D. Indeed, a focus on PWIs as the pinnacle of applied research and technological innovation creation has to a large degree damaged the R&D capacities of many minority-serving institutions, thus marginalizing the networks of investigators of color along with their diverse capabilities, approaches, and perspectives they bring to the research arena (Moore et al., 2012). Consequently, these institutions and their affiliated faculty members remain underrepresented and tokenized in the disability and health R&D arena. A tokenism theoretical (Kanter, 1993) lens view perspective of this intersectionality suggests that such discrepancies could serve as a primary contributor to the under-participation of these institutions and their researchers in R&D. Because of these significant weaknesses and other statistics suggestive of structural inequity prevalence across the federal research agency landscape, a new paradigm described in detail below is emerging. This shift in the scholarly discourse and conversation recognizes that these institutions and their affiliated researchers can be as crucial to advancing the scientific enterprise as PWIs.

Shift Toward Strengthening Research Capacity

There is growing consensus that the state of rehabilitation and health service systems outcomes among people of color with disabilities is closely linked to minority-serving institutions' capacity to participate optimally in cutting-edge R&D (Manyibe, Moore, Aref, et al., 2017; Moore et al., 2012; Moore, Manyibe, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017). While disability/health and rehabilitation disparities across these diverse populations are well documented (Dzau et al., 2017; Lukyanova et al., 2014; Manyibe et al., 2012; Moore et al., 2015), the ways that their R&D under participation might perpetuate persisting inequities as well as their potential role in mitigating such inequalities is gaining attention. Moore et al. (2012) and Moore, Manyibe, Sanders, et al. (2017) pointed out that the participation of faculty members from these institutions is critical to addressing the rehabilitation and health needs of people of color with disabilities. Other scholars (i.e., Hoppe et

al., 2019; Sutton et al., 2013) have also noted that increasing the number of minority researchers could increase the credibility of findings and trust in research-driven initiatives targeting communities of color that have a history of research related distrust.

Contrary to the traditional paradigm that focuses on research barriers at minority-serving institutions, the emerging paradigm promotes policies, priorities, and strategies that empower them to participate optimally in cutting-edge R&D. This approach calls for U.S. congressional leaders, federal research agency leaders and policy strategists, and leaders at minority-serving institutions to work in partnership to develop innovative and creative funding pools and mechanisms to develop initiatives aimed at strengthening their research capacity. The question of "What research barriers exist at minority-serving institutions?" is being replaced with the question of "What opportunities for R&D exist at minority-serving institutions?" Within the context of this new paradigm, understanding research challenges are only relevant when the aim is to identify capacity building needs, interventions, and strategies that enhance infrastructures that support research as well as research skills (i.e., methodology and grant-writing), knowledge, and self-efficacy among faculty members and students. This strength-based paradigm acknowledges unique R&D participation issues minority-serving institutions face– internal challenges of infrastructure (e.g., research culture, cyberinfrastructure, limited resources, and lack of adequate mentorships opportunities) and external systemic obstacles (e.g., inadequate networks and limited external funding) (Aref et al., 2017; Moore, Aref, Manyibe, et al., 2016). Most important, it also recognizes unique assets including; established leaders in advanced research, rising early-career researchers, talented students, and close proximity to historically under-resourced and structurally depressed minority communities as unique ingredients that position them to play an invaluable role in advancing the disability, health and rehabilitation science and literature.

In our seminal study (i.e., Moore et al., 2012) that investigated barriers that prevent HBCUs from optimally participating in the federal disability and rehabilitation R&D enterprise, we not only made several recommendations that could be considered to address such challenges, but also called for a paradigm shift in research capacity building approaches. For example, we espoused a renewed federal disability/health and rehabilitation research agenda that expands the breadth of funding beyond a select group of PWIs. In subsequent studies (Manyibe, Moore, Wang, et al., 2017; Moore, Wang, Davis, et al., 2017), we identified and documented minority disability and health research leaders' experiences and perspectives on career development and scientific workforce diversity development strategies. Based on the findings, we recommended that NIDILRR and NIH consider developing a Rehabilitation Engineering Research Center (RERC)-like stream of funding with the specific mission of developing new models and associated techniques for further developing well-trained researchers of color.

The emerging paradigm is also accompanied by a corresponding shift in values –using social justice and equity imperatives to evaluate the way we choose to share scarce resources. Scholars and other higher education stakeholders increasingly demonstrate the importance of considering social justice and equity imperatives as integral to research funding and investment policies and priorities, and decision-making processes that address the root causes of systemic patterns of marginalization among

minority-serving institutions and their affiliated investigators. Indeed, a growing body of evidence (Ginther et al., 2011b, 2012; Hoppe et al., 2019; Moore et al., 2012) suggests inequities in the ways federal R&D investments are allocated to applicants. Consequently, prominent researchers including Ginther et al. (2011a) and Moore et al. (2012) have called for federal research agencies to reimagine the way they develop priorities and distribute financial resources across their R&D investment portfolios. In particular, they promote a shift from grant-making efforts that favor concentrating resources primarily within the majority context to more equitable research funding regimes based on social justice principles. Additionally, this shift of focus advocates for innovative perspectives that entail the identification of creative strategies to strengthen research capacity at minority-serving institutions. We interpret the funding of the Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities at Langston University (LU-RRTC), an HBCU, as an unambiguous signal that NIDILRR wants to be at the forefront of ensuring that minority-serving institutions play a prominent role in the R&D space. We also strongly believe that if capacity building efforts continue to focus on PWIs, the needed critical mass of well-trained minority researchers will remain underdeveloped. Inevitably, the U.S. could lose its position at the forefront of disability, health, and rehabilitation research enterprise.

Consciousness Shift

A consciousness shift is emerging in which minority-serving institutions have begun to see themselves as more than just teaching institutions, but also as centers of scientific inquiry and innovation (Moore et al., 2012). Likewise, faculty members based at these institutions more often identify themselves not just as teaching faculty but also as researchers capable of conducting cutting-edge research. In other words, their institutional leaders and affiliated scholars and students are refusing to be marginalized in the research arena. Three major forces drive this consciousness shift toward research at these institutions. First, the current knowledge economy, which emphasizes the need for an integrated approach towards research, innovation, and education policies, has incentivized these institutions not only strive to be known for their excellent teaching and service but also their cutting-edge research. Consequently, a growing number of these institutions' vision, mission, and strategic plan statements embrace and emphasize scientific production of culturally competent knowledge and knowledge translation products as key to their institutional directions (Moore et al., 2015). To actualize their research missions, the LU-RRTC, for example, provided technical assistance to several minority-serving institutions that culminated in the development of strategic plans that provided them a roadmap for improving research infrastructure, research skills enhancement, and increased disability/health and rehabilitation research productivity.

Second, minority-serving institutions are increasingly using research performance (e.g. peer-reviewed publications, research grants obtained) as incentives for tenure and promotion (Moore et al., 2015). This is partly because these institutions realize that they directly benefit (e.g., through indirect cost rates and prestige) from increased scientific productivity. Although the value assigned to such production may be weighted differently based on institutional missions, research performance

assessment (Hardre et al., 2011) has evolved into a typical evaluation component across many minority-serving institutions, particularly in the case of tenure and promotion (Manyibe et al., 2015; Moore et al., 2012). Moreover, like their counterparts at many PWIs, faculty scholars at minority-serving institutions recognize that their reputation and authority depend on their productivity (Moore, Aref, Manyibe, et al., 2016).

Third, the high stakes nature of procuring federally-funded R&D grants, competition to hire well-trained and talented faculty scholars and researchers, and the prestige of national ranking require higher learning institutions strategically position their agendas to become the next frontier for scientific discovery, technological development, and applied problem solving (America, 2012; Bernal & Ortiz-Torres, 2009; Gasman, 2010; Moore et al., 2012; Rabionet et al., 2009; Yanagihara et al., 2009). Minority-serving institutions, in spite of many historical and contemporary challenges, are no exception to this rule; they play a significant role in the creation of our shared knowledge economy. This consciousness shift continues to witness some of these institutions emerge both as education powerhouses and leaders in research and innovation. Consequently, we are experiencing a shift in the balance of power, albeit slowly, such that these institutions have started to compete with PWIs in the research arena by focusing on specialized niche areas such as culturally competent R&D. Certainly, they are reinventing their internal and external research image and purpose.

Shift From Single to Team-Based Peer Multiple Mentor Approaches

Research mentorship has long been considered a preeminent research capacity building strategy (Beech et al., 2013; Feldman et al., 2010; Kram, 1983; Nick et al., 2012), and remains essential to maintaining and advancing a vital R&D enterprise in the field of disability/health and rehabilitation (Manyibe et al., 2015). However, traditional mentorship models designed to improve the research skills (i.e., research methods and grant writing) of faculty scholars and students have proved insufficient for building such capacities at minority-serving institutions. Subsequently, a paradigm shift in mentorship approaches is emerging and changing the field in three ways. First, the traditional relationship between the mentor and mentee is shifting. Contrary to traditional mentorship approaches where hierarchical, top-down relationships characterize the interaction between the protégé and mentor, new mentorship approaches de-emphasize the power of seniority and instead promote a team-based approach and peer relationships (Manyibe et al., 2015).

Second, the application of multiple mentors instead of a single seasoned mentor in the research mentoring scheme is becoming the norm. This is a shift that is sure to continue due to an ever-evolving workplace characterized by new technologies, a diverse workforce, and increased team science. While the traditional approach emphasizes the need for mentees/protégé to work with a single seasoned mentor, this new paradigm inspires protégées to cross-fertilize their research agendas (e.g., research grant proposal and manuscript development) through exchanges with a primary mentor and a panel of mentors comprised of content experts, multicultural specialists, methodologists, and statisticians (Manyibe et al., 2015; Moore, Manyibe, Aref, et al., 2017). The increased use of multiple mentors is based on social network theory (Liu et al., 2017), which posits that social networks such as mentoring networks offer

many benefits when compared to the traditional one-on-one mentoring senior-junior mentor dyad. The theory further posits that those who are connected tend to have more power and influence. On the other hand, those who are not well connected are often relegated to the periphery. Accordingly, contemporary mentees need multiple mentors who can provide them with different skills and knowledge at various stages during their careers.

Third, there is also a shift from PWI-based mentors to minority-serving institution affiliated mentors. This is a type of reverse mentoring where a scholar at a minority-serving institution (i.e., senior/junior) mentors a senior/junior person (e.g., senior researcher) based at a PWI. Reverse mentoring allows horizontal and vertical knowledge sharing as opposed to the traditional cross-race mentoring, where faculty of color are often mentored by White researchers (Morris, 2017; Harvey et al., 2009). For example, a senior researcher at a PWI may be partnered with an experienced senior or early-career researcher at a minority-serving institution to help the PWI affiliated scholar interested in conducting disability/health and rehabilitation disparities research understand how to conduct cutting edge cultural competency research. Reverse mentoring approaches recognize that minority-serving institution affiliated scholars, for example, who tend to be immersed in the culture of minority populations, can help experienced or early career researchers based at PWIs to become culturally competent in conducting research. Moore, Wang, Davis, et al. (2017) recommended that NIDILRR consider developing additional funding mechanisms that would provide minority-serving institution grantees the "resources to devise training protocols that would allow them to teach minority-serving institution based seasoned investigators and those at Research 1–designated PWIs how to mentor minority researchers in disability and health disciplines" (p. 247).

Shift from Skill Building to Infrastructure Improvement

Infrastructure (i.e., research facilities, equipment, materials, and services) plays a central strategic role in scientific inquiry, research training, and teaching (McGill & Settle, 2012; Sutherland et al., 2013). Scientific performance depends largely on such structural components that comprise robust research infrastructure ecosystems. As espoused through the structural empowerment theoretical lens view, employees' access to or the support of organizational structures and support systems are just as important to their work performance as personal qualities (Kanter, 1993). Despite this notion, the traditional research capacity building paradigm has tended to focus on building individual investigators' research skills rather than organizational research support systems, which is akin to training a plumber to address plumbing issues without providing him or her the tools necessary to do the job.

The emerging paradigm calls for an expanded all-inclusive approach that focuses on institutional infrastructure systems enhancement, research skill development, and external federal agency policy, consequent initiatives, and systems (e.g., Congress and funders) that influence the research process (Moore, Manyibe, Sanders, et al., 2017). Utilization of this wide-ranging approach is especially suited for minority-serving institutions, specifically those historically underrepresented in the federal research arena and thus oftentimes lack the requisite research infrastructure (e.g., research tools and technologies, digital libraries, office of sponsored programs, communication and network systems, statistical software,

early career awards, and research centers) that promote and facilitate research and innovation. In this regard, federal research agencies have a unique role to play in building the capacity of these institutions and affiliated researchers to conduct cutting edge, rigorous R&D. To address complex questions and find translational solutions to rehabilitation and health inequities, the federal government will have to muster sufficient political will to increase appropriations (e.g., Section 21 of the Rehabilitation Act) to adequately address research infrastructure issues at minority-serving institutions. Nonetheless, current federal agency investments in research infrastructure enhancement at these institutions, albeit at insufficient levels, is promoting a shift in the higher education landscape where the focus on strengthening research support systems is becoming more recognized and emphasized.

Shift to Empowering Collaborations

Collaboration has been consistently identified as a driver of research excellence (National Research Council, 2015). In the disability/health and rehabilitation sector, this type of partnership frequently centers around improving situations related to health and function, community living, and employment (Rosen-Reynoso et al., 2017). The most common model of the minority-serving institutions and PWI collaborations, influenced by the old paradigm, calls for the latter to provide the research and technical expertise while the former provides access to minority populations as study participants (Malik et al., 2017). In these alliances, minority-serving institutions such as HBCUs are generally designated as a subcontractor while PWIs in the collaboration serves as the applicant or 'grantee' (Moore et al., 2012). Scholars (i.e., Treadwell et al., 2009; Zea & Bowleg, 2016) have argued that in such collaborations, PWI-based investigators should be "fully integrated" with HBCUs to increase their research capacity. Treadwell and colleagues (2009, p.S55) argue that this integration approach is necessary given that the current research capacity at HBCUs "is not commensurate with their vision, credibility, and track records in developing outstanding research scholars."

We disagree with Treadwell and colleagues' (2009) and Zea and Bowleg's (2016) sentiments, which are largely based on the old paradigm; appearing to paint all HBCUs and affiliated scholars with a broad brush as incapable of conducting high-quality R&D due to their institutional leaderships' lack of vision, research credibility issues, and inadequate track records in training research leaders. This traditional partnership model, although necessary in some contexts, might disadvantage many HBCUs in several ways. First, this sort of alliance raises issues related to the "usurpation of identity and independence" (Harley et al., 2000, p. 364). Primarily, historic relationships between African Americans and Whites raise concerns about assimilation (Harley et al., 2000), which can undermine collaborative initiatives and discourage HBCU faculty members from participating in R&D (Moore et al., 2012). Second, the model also perpetuates the stereotype that HBCUs and other minority-serving institutions do not have the capacity to conduct independent, rigorous research, a negative connotation associated with their teaching focus. A third concern is that this type of collaboration indicates the low expectations federal research agencies and PWI-based researchers have about researchers at HBCUs. Finally, this practice denies HBCUs the financial resources needed to strengthen their capacity to conduct and manage research.

The nature of these alliances between researchers at minority-serving institutions and those based at PWIs is slowly but surely shifting. Some HBCU presidents/chief executive officers, for example, are beginning to strategically align their visions with research and grantsmanship intermediate and long-range objectives, and continually tout the research prowess of research faculty on their campuses. HBCU-based faculty members continue to procure R&D grant funds from federal agencies and private foundations that help to (a) enhance their institutions as well as their own credibility and prestige in the scientific community through advancing the science and literature and (b) create a track record at these institutions in growing and training future research leaders in their own institutional context constituting a safe and nurturing environment to learn to do research.

Credibility in R&D as a construct is highly subjective and tends to lie in the "eye of the beholder," especially within the racial milieu. For example, race-based disparity research at PWI research-intensive institutions conducted by researchers of color (i.e., African Americans) is often devalued and marginalized whereas that same line of research conducted by White researchers at PWIs is perceived as credible (Moore et al., 2012; Smith, 2013). This credibility discrepancy, in alignment with Treadwell and colleagues' (2009) and Zea & Bowleg's (2016) credibility assertion, would require investigators of color at PWIs leading such research to "fully integrate" White investigators at PWIs into their work. This old paradigm's lens view creates an apparent double-standard and further illuminates institutional power differentials; HBCU-based faculty scholars are perceived as incapable of conducting cutting-edge research, and thus priorities are developed to mandate "fully integrated" collaborations while PWI-based minority faculty scholars are oftentimes perceived as inadequate in this research topic, but no such expectations or priorities are endorsed. Yet, faculty scholars at minority-serving institutions and PWIs themselves continue to prescribe to the old exemplar that essentially recognizes the PWI-based White researcher as the pinnacle of research integrity who undoubtedly needs to be integrated into minority-serving institution driven research for the findings to be seen as credible. This line of thinking is somewhat baffling since these institutions, although similar in several ways, differ on characteristics (i.e., available advanced researchers, value for research among the leadership, and presence of research centers) that contribute to strong micro-research cultures within their institutions. Secondary gain issues might perhaps help to explain how researchers at HBCUs and minority researchers at PWIs have come to seek the marginalization of a group of institutions dedicated to improving the lives of people of color with disabilities.

The emerging paradigm, consistent with the recommendations of our seminal study (Moore et al., 2012), promotes what we believe is a more meaningful type of collaboration model. For example, we called for collaborations that designate HBCUs as "applicant/grantee," and not sub-contractor, when such collaborations are stipulated in funding opportunity announcements (FOA). We further recommended that the designation should be noted as an "absolute priority," and especially adopted for FOAs that address race-based disability/health and rehabilitation disparities. NIDILRR's recent policy initiatives and priorities (i.e., FY 2018 FOA- RRTC on Research and Capacity building for Minority Entities, FY 2017 FOA- Advanced Rehabilitation Research Training Project: Minority-Serving

Institutions, and FY 2017 FOA- Field Initiated Project-Minority-Serving Institutions) that limit the competition to minority entities and Indian Tribes evidences this paradigm shift. This new approach ensures that these institutions will actively engage in doing and leading the research across the whole scientific paradigm, enhancing their learning, experience, confidence, and competence in R&D grant management.

The emerging paradigm also calls for federal agencies that sponsor research (e.g., NIH and NSF) to develop innovative incentives that will encourage collaborative research projects that involve minority-serving institution affiliated researchers in the total research paradigm (e.g., identification of the problem, development of research questions/hypotheses, data collection, analysis of data, interpretation, and report writing). This framework supports a "Research Team" model that includes a clear articulation of federal research agencies' expectation that faculty members at minority-serving institutions participate across the total research process in such collaborations.

Shift From Positivism to Critical Multiplism

The social science field has and continues to experience methodological paradigm shifts. During the 19th and early 20th centuries, for example, many social scientists subscribed to positivism or traditional science (Katz & Hoyt, 2014; Kerdeman, 2015). The positivistic paradigm of research attempted to employ the methods of the natural sciences in understanding social phenomena. Positivists contend that researchers, regardless of their background (e.g., race/ethnicity, and institution type), can be objective and neutral by relying on quantitative research methods (Denzin, 2008). Over time, this traditional model faced growing criticism. For example, the critics of positivism rejected the notion of objective reality and contended that multiple realities exist because human beings' experience of the phenomenon is largely individual rather than collective (Kerdeman, 2015). Additionally, they believed that researchers construct realities as they experience them; hence the need for researchers to respect multiple viewpoints (Katz & Hoyt, 2014; Kerdeman, 2015). They argued that knowledge is both socially constructed and culturally relative (i.e., scientific knowledge is unavoidably perspectival). Furthermore, they contended that social scientists, like all human beings, see the world through the inescapable cultural lenses, ontological positions, epistemological orientations, and axiological beliefs, and thereby inevitably bring their biases to the research process (Katz & Hoyt, 2014). In other words, the reality is a subjective creation and thus the existence of a single reality is a fallacy.

The criticisms of the positivist approach eventually gave birth to the qualitative research paradigm (i.e., social constructivism). For some time, the quantitative and qualitative research paradigms coexisted as separate and fiercely competed for dominance in the social science field. The tensions between quantitative and qualitative proponents prompted calls for combining the two approaches. Subsequently, the mixed method approach was born. Mixed methods research can be defined as an approach to inquiry and research that combines elements of quantitative and qualitative methods (e.g., data collection, and analysis) into one study to broaden understanding of phenomena (Johnson et al., 2007). More recently, a growing number of researchers have recognized that the mixed methods approach does not sufficiently address methodological questions, especially those raised by Indigenous

researchers and their allies. This acknowledgement preceded the shift toward critical multiplism, which is based on the belief that no one approach is ever sufficient for developing a valid understanding of a phenomenon (Patry, 2013).

We agree with the proponents of critical multiplism, who argue that investigating multiple research questions using multiple measures, samples, methods, and analyses are essential to ensure a more accurate understanding of a phenomenon. For example, Indigenous researchers and allies (Braun et al., 2013; Louis 2007; Shreve, 2015; Simonds & Christopher, 2013) contend that quantitative, qualitative, and mixed methods research constructs, which are rooted in the culture of Euro-American society, serve to support its continuation and dominance "by judging which research constructs are valid, determining how constructs are defined, and deciding which variables need to be controlled" (Braun et al., 2013, p.123). They argue that "gathering data from an Indigenous person does not necessarily indicate that Indigenous knowledge has been gathered (Simonds & Christopher, 2013). Consequently, they have called for the decolonization of the academic research enterprise and advocated for the scientific community to value Indigenous research methodologies as true science. Contrary to the old paradigm that allowed the scientific community to devalue new knowledge generated through Indigenous methods of knowing (Louis, 2007; Sanders et al., 2018), we strongly recommend that the new paradigm of critical multiplism should accept Indigenous research methodologies as a valid means of scientific inquiry.

Indigenous researchers further observe that Indigenous methodologies "take research further along the path of recognizing self-determination of Indigenous peoples and supporting Indigenous leadership in the conceptualization and carrying out of research and in the interpretation and dissemination of research findings" (Braun et al., 2013, p. 124). As part of this shift, Indigenous scholars and their allies (e.g., Moore, Manyibe, Sanders, et al., 2017; Shreve, 2015; Simonds & Christopher, 2013) have increasingly called for the inclusion of Indigenous methodologies in academic programs, peer review processes, and grant-making decisions. Noting that the nation's scientific workforce depends on a diverse pool of well-trained researchers, these scholars have encouraged policymakers and strategists to utilize minority-serving institution infrastructure as a strategic pathway to increase the supply of intramural and extramural research leaders of color available to mentor culturally competent social scientists, especially those from historically underrepresented minority groups (Louis, 2007; Moore, Manyibe, Sanders, et al., 2017; Sanders et al., 2017). The enhancement of sustainable research capacity within HBCUs and TCUs is imperative to enable them to contribute to improved disability, health, and rehabilitation outcomes among minority communities (Moore, Manyibe, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017). Furthermore, we believe that no one research methodology is capable of bridging gaps that exist between methods. Each method has its strengths and weaknesses. Therefore, traditional forms of inquiry, such as Indigenous methodologies, should enjoy the same respect as Western methodologies. Critical multiplism, which espouses methodological pluralism, provides a promising framework for conducting social science studies in research capacity building context.

Minority-Serving Institution Ecosystem

Minority-serving institutions are situated in both rural and urban communities whereby their constituency is empowered to celebrate diversity, embrace the needs of the communities they serve, and facilitate a commitment to supporting cultural values, traditions, and worldviews of individuals from racially and ethnically diverse groups (Cunningham et al., 2014; Gasman, 2010; Moore, Manyibe, Aref et al., 2017). Consequently, they continue to play a unique role in helping these communities maintain, preserve, and restore cultural traditions (Brayboy et al., 2012; Cunningham et al., 2014), which help them remain vibrant, strong, and resilient. According to Cunningham and Parker (1998), for example, TCUs contribute to virtually every aspect of community life. Although they vary substantially on a number of metrics such as size, classification, enrollment, and mission, they maintain the common goal of meeting the needs of the populations they serve (Cunningham et al., 2014; Epps & Guidry, 2009; Rabionet et al., 2009; Rosen-Reynoso et al., 2017; Yanagihara et al., 2009). Although in general minority-serving institutions possess smaller student bodies, these institutions enroll a disproportionately large percentage of low-income (i.e., Pell Grant recipients) and minority students that include African American, Latinx, Native American or Alaskan Native, and Asian American and Pacific Islander students (Clewell et al., 2010; Gasman, 2010).

In addition to serving a diverse student body, minority-serving institutions continue a proud tradition as vibrant centers of intellectual inquiry and engines of scientific discovery and innovation, leading to solutions to complex national and global problems, particularly those with cultural nuance such as disability/health and rehabilitation inequities (Lee & Keys, 2013; Moore, Wang, Johnson, et al., 2016). For example, several faculty members affiliated with minority-serving institutions have and continue to receive numerous patents (Lee & Keys, 2013). Indeed, these scholars are not only uniquely qualified as research producers but also recognize culture as a contextual central explanatory variable in the research process rather than a discrete variable that can only be manipulated and controlled (Manyibe et al., 2015; Moore et al., 2012; Moore, Aref, Manyibe, et al., 2016). Unfortunately, although minority-serving institutions continue to play a key role in the higher education landscape, which embraces knowledge triangle (i.e., research, education, and innovation), many face a plethora of challenges that hinder their ability to conduct research. These challenges include a limited number of research capacity building projects, inadequate research leaders or mentors, insufficient R&D and/or research capacity building funding and resources, negative research culture, and little knowledge on expert panel participation processes and discretionary programs.

To be sure, many universities and colleges in the U.S. experience research capacity building challenges. However, the challenges minority-serving institutions experience are especially severe and can be addressed through intentional, planned research capacity building efforts, especially by collaboratives involving state and federal agencies, other minority-serving institutions, community leaders, research institutes, PWIs, and other stakeholders. Another avenue for planned capacity building at these institutions is in the research center concept. Rogers (2012) examined patterns of scientific and technical human capital that emerge in research centers in three different contexts: HBCUs, PWIs,

and the Experimental Program for the Stimulation of Competitiveness in Research (EPSCoR). Study findings revealed that, compared to majority institutions, research centers at HBCUs had a variety of impacts on their organizational and institutional abilities to conduct research. Conversely, many PWIs have strong R&D governance structures, which allows them not only secure larger shares of federal research funding (Li et al., 2008) but also continue rebuilding and regenerating their research capacity. Brief descriptions of HBCUs, TCUs, and HSIs are provided below.

Historically Black Colleges/Universities

The Higher Education Act of 1965 defined an HBCU as any historically Black college or university established prior to 1964, whose principal mission was, and is, the education of African Americans, and that is accredited by a nationally recognized accrediting agency or association determined by the Secretary [of Education] to be a reliable authority as to the quality of training offered or is, according to such an agency or association, making reasonable progress toward accreditation (Espinosa et al., 2017; Saunders & Nagle, 2018). HBCUs are defined as historical because they were established with the expressed purpose of serving African Americans. Higher education for most African Americans was only a dream before the Civil War, which brought the slavery era to an end. The hallmarks of slavery, such as race-based discrimination, segregation, and poverty, locked out many African Americans out of the school system (Gasman et al., 2015). During the slavery era, it was illegal for African Americans to receive any formal education. Recognizing the importance of education and determined to unlock the potential of Blacks, visionary African Americans, missionaries, and philanthropists mobilized capital and human resources to establish HBCUs to provide educational opportunities to African Americans.

HBCUs throughout their history have and continue to play a crucial role in providing educational, research, professional, and personal development opportunities to a diverse student population, especially African Americans (Arroyo & Gasman, 2014; National Academies of Sciences, Engineering, and Medicine, 2019). Ultimately, these institutions play a critical role in developing the nation's workforce in every field. Historically, they have been the only avenue for many African Americans to access and receive a college education. Currently, HBCUs serve approximately 300, 000 students (Ellis et al., 2016; Gasman & Abiola, 2016). The U.S. Department of Education's National Center for Education Statistics data indicates that in 2016-17, HBCUs conferred some 49,500 degrees, the majority (74%) of them conferred to African American students (de Brey et al., 2019). Specifically, they conferred 5, 511 associate's degrees, 33,500 bachelor's degrees, 7,966 master's degrees, and 2,490 doctoral degrees. Moreover, HBCUs awarded 15% of bachelor's degrees and 19% of science and engineering bachelor's degrees earned by African Americans, and award 35% of bachelor's degrees to African Americans who go on to earn PhDs in the science, technology, engineering, and mathematics (STEM) areas (de Brey et al., 2019).

Interestingly, most degrees awarded to African American students at all levels were awarded to African American female students, indicating a critical role they are playing in narrowing the gender gap in educational attainment and social mobility. Indeed, over the years, HBCUs have been ranked

among top producers of African American graduates (Bracey, 2017; Lee, 2012; Lee & Keys, 2013). Today, these institutions continue to offer an opportunity for African American students to receive a high-quality education (de Brey et al., 2019; Lee & Keys, 2013), although they have many choices as a result of desegregation in higher education. Several reasons that make HBCUs exceptional learning institutions, especially for African American students and other minorities include: (a) a supportive environment that facilitates personal and academic health of students; (b) availability of role models and mentors for African American students, an ingredient usually lacking at PWIs; (c) racial diversity at all levels, which allows students to adjust seamlessly to the realities of integrated settings (Bracey, 2017; Harley et al., 2000); and (d) availability of collaborative faculty-student research opportunities. These clearly demonstrate that HBCUs provide a unique learning environment for students to succeed and matriculate. Furthermore, their faculty members are motivated to provide exceptional and student-centered educational opportunities for all students who are committed to mental, physical, and spiritual growth.

HBCUs also play an essential role in addressing local community development needs such as neighborhood revitalization, housing, and economic development. According to an economic impact report produced by the 2017 United Negro College Fund (UNCF), the impact of HBCUs on their regional economies included an employment impact of 134,090 jobs, work-life earnings of $130 billion for HBCU students; and a total economic impact of $14.8 billion. Besides, they are generating substantial financial returns year after year (Humphreys, 2017; Saunders & Nagle, 2018; UNCF, 2017).

Tribal Colleges and Universities

Tribal colleges and universities (TCUs) are critical vehicles for the development of tribal communities across Indian Country and the nation at large (Brayboy et al., 2012; Schimdt & Akande, 2011; Thunder, 2015). Located on or near Indian reservations, they were established and are operated by American Indian tribes to educate Native people. Currently, there are 36 accredited TCUs that serve more than 30,000 Native American and Alaskan Native students (Brayboy et al., 2012). As reflected in Executive Order 13592, TCUs maintain, preserve, and restore native languages and cultural traditions; offer a high-quality college education; provide career and technical education, job training, and other career-building programs; and often serve as anchors in some of the country's poorest and most remote areas (Brayboy et al., 2012; Cunningham et al., 2014; Obama, 2011).

According to Cunningham and Parker (1998), TCUs are unique because they are genuinely community institutions, and they contribute to virtually every aspect of communal life. These institutions have not only profoundly changed the higher education landscape for Native American or Alaska Natives, they have also helped build the capacities of their communities and improved the effective use of tribal resources. For example, Bull (2015) identified cultural renaissance, community education, technology, library access, and research partnerships as strategies that TCUs are using to address community issues and resources, economic impacts and entrepreneurship, and social education impact and to build tribal communities. Unfortunately, the important role they play is undermined by research capacity barriers. Consequently, there is a growing consensus among researchers, tribal

disability and health experts, disability advocates, and policymakers that strengthening and sustaining sufficient TCU research capacity is vital to enhancing employment, community participation, and health and function outcomes among Native Americans or Alaskan Natives with disabilities and to realizing the overarching objective of advancing a diversified scientific workforce (Manyibe et al., 2015; Moore, Manyibe, Sanders et al., 2017).

Hispanic-Serving Institutions

Hispanic-serving institutions (HSIs) are increasingly shaping the higher education landscape in the U.S. They represent post-secondary non-profit colleges and universities with full-time equivalent undergraduate enrollments at least 25% Latinx (Garcia, 2017; Hispanic Association of Colleges and Universities [HACU], 2018). HSIs enroll about 2,075,317 or 63% of all Latinx students and 24.5% of all students (Excelencia in Education, 2017; HACU, 2018). Although HSIs account for 12% of all U.S. colleges and universities, they educate 60% of enrolled Latinx students in higher education (HACU, 2018). Many of these students are low-income and first-generation college attendees.

The number of HSIs has grown rapidly over the years to meet the educational needs of the nation, especially those of the Latinx community, which is the fastest-growing minority group in the nation. Specifically, the number has increased from 189 in 1994 to 492 in 2016 (HACU, 2018). Of the 492 HSIs in 2016, 215 (44%) were public two-year institutions, 120 public four-year institutions, 135 private four-year institutions, and 22 private two-year institutions. In addition, there are several emerging HSIs (i.e., colleges and universities with growing Latinx enrollments that do not yet meet the federal enrollment threshold criteria to be identified as HSI) that are providing educational opportunities for Latinx who are entering college in large numbers (Santiago & Andrade, 2010).

Many of these institutions began as PWIs located in regions that experienced significant demographic growth in terms of Latinx births and immigration (Hurtado et al., 2015). The concept of HSIs was born when educators, policymakers, and other higher education stakeholders recognized that while a few postsecondary institutions enrolled large numbers of Latinx students, they could not however meet their unique needs due to inadequate financial resources, culturally competent human capital, and infrastructure. Accordingly, HSIs are characterized by their enrollment ratios rather than by their institutional mission. The federal government developed the HSI classification in 1992 when the Higher Education Act was reauthorized (Excelencia in Education, 2017). To demonstrate the importance of HSIs, the White House Initiative on Educational Excellence for Hispanic Americans was established in September 1990 by President George H. W. Bush to address the educational disparities faced by the Latinx community through targeted investments and innovative models designed to improve educational outcomes among Latinx students (Osanloo & Reyes, 2013). Since then, Presidents William J. Clinton, George W. Bush, Barack Obama, and Donald Trump have all recognized this significant need through the renewal of the initiative.

Why Strengthen Minority-Serving Institutions' Research Capacity?

Strengthening the abilities of minority-serving institutions to participate optimally in federally-sponsored R&D is essential to maintaining and advancing the disability/health and rehabilitation

science (Moore et al., 2012). A vital national need thus exists to (a) build and/or strengthen research infrastructure at minority-serving institutions and (b) increase the supply of well-trained researchers based at these institutions available to lead and participate in solution-focused translational research aimed at improving rehabilitation and health outcomes and experiences among people of color with disabilities. Below we discuss several reasons that support the need for strengthening their abilities to conduct leading R&D. Six major influencing factors that drive research capacity and infrastructure improvement at minority serving institutions are reviewed. These factors include racial and ethnic minority disability/health and rehabilitation disparities, public policy, rapid demographic shifts, diversification of the scientific workforce, achieving efficiency of investments, and social justice and equity in research funding.

Public Policy Context

The need to improve the current state of disability/health and rehabilitation research capacity and infrastructure across minority-serving institutions is largely driven by public policy mandating federal research agencies to engage them in accordance with the guidance/guidelines and spirit of the law (Moore, Aref, Manyibe, et al., 2016). Section 21 of the 1998 Rehabilitation Act Amendments (Public Law 93-112) and the Minority Health and Health Disparities Research and Education Act of 2000 (Public Law 106-525) represent significant pieces of legislation that have provided the impetus for building their research capacity. Specifically, Section 21 serves as the most important piece of U.S. federal legislation empowering people of color with disabilities to achieve successful rehabilitation. This mandate documents patterns of inequitable treatment for members of these target populations across all junctures of the vocational rehabilitation process (Lewis et al., 2007). In an effort to eradicate such inequalities, the mandate calls for the NIDILRR to further diversify its scientific workforce. Through the authority of the mandate, NIDILRR empowers and collaborates with minority-serving institutions to build their research capacity and infrastructure and their affiliated investigators' research skills to address disparities among people of color with disabilities. In addition, Section 21requires NIDILRR to set aside 1% of its annual appropriations to address traditionally underserved racial/ethnic populations.

To this end, the agency has recently placed an even greater policy emphasis on enhancing minority-serving institution participation through building institutional research capacity. Since FY 2013, for instance, the NIDILRR has continuously developed policy initiatives in the form of "absolute priorities" limiting applicants to minority-serving institutions across select mechanisms within its investment portfolio (i.e., Field Initiated Research Program [FIP], Advanced Rehabilitation Research Training [ARRT] projects, and a Rehabilitation Research and Training Center [RRTC]). The agency also continuously informs its efforts to extensively address Section 21 through regularly soliciting external key stakeholder input through strategic planning meetings and other forums. For instance, on June 23, 2015, the agency held a *Strategic Planning: Listening Session* as a part of its *Section 21 Capacity Building Meeting* where Fellows, principal investigators (PIs), project directors, and other invited guests discussed the strengths and opportunities within the minority-serving institution network to inform the agency's efforts to improve research capacity building outcomes (NIDILRR, 2015).

The Minority Health and Health Disparities Research and Education Act of 2000 (Public Law 106-525) represents the federal government's response aimed at addressing health disparities and thus (a) created the National Center for Minority Health and Health Disparities (NCMHD) at NIH, (b) mandated the AHRQ to conduct research on minority health and health disparities, and (c) directed the National Academy of Sciences (NAS) to examine and report on minority data collection practices of the Department of Health and Human Services (HHS). Consequently, three notable programs were established under the law with the ultimate goal of creating a diverse research workforce; which targets minority-serving institutions as a key resource. These programs include the Centers of Excellence for Research Education and Training, Loan Repayment Program for Minority Health Disparities Research, and the Research Endowment Program.

Although progress has been achieved since the passage of these legislative agendas, people of color with disabilities continue to experience inequalities across all NIDILRR identified outcome domains – employment, health and function, and community living and participation – when compared to their White counterparts. Minority-serving institutions also continue to be underrepresented and their scholars of color remain marginalized and tokenized in the disability/health and rehabilitation research enterprise (Ginther et al., 2011a, 2012; Moore et al., 2012). Also, they seldom receive federal funds to develop their infrastructure and human capital, which are essential research productivity ingredients. Thus, a mix of efforts will be required to address these issues, to include revising existing policies or formulating additional legislative mandates that build on the progress that has been made as well as respond to current challenges to ensure that these institutions can attain research self-reliance. Achieving research self-reliance would depend on several intrinsic and extrinsic individual and institutional contextual factors such as the presence of a critical mass of personnel with up-to-date R&D skills, state-of-the-science and well maintained research infrastructure (buildings, equipment, electronic communication, and other facilities), means and opportunities for participating in R&D collaborations, ongoing research projects, knowledge translation capacity, research leadership to establish research/development agendas, federal agency funding practices, and the existing political climate (Brayboy et al., 2012; Moore, Aref, Manyibe, et al., 2016).

Racial and Ethnic Disparities Context

Disability/health and rehabilitation disparities across racial and ethnic populations in the U.S. are well documented (U.S. Department of Labor, 2017; Dzau et al., 2017; Lukyanova et al., 2014). Disability or rehabilitation disparity is defined as the existence of differential rates of occurrence of disability, access to formal rehabilitation services, participation in services, as well as less favorable outcomes of services among people of color in comparison to majority populations (Lewis et al., 2009). Health disparities, on the other hand, are described as systematic, socially produced, and important differences in health between groups that are not only unnecessary and avoidable, but additionally are unjust and unfair (Goode et al., 2014). According to a recent national BLS (2017) report titled *Persons With a Disability: Labor Force Characteristics-2016,* the unemployment rate for African Americans with disabilities (16.6%) was nearly twice that of Whites (9.5%) with disabilities; and the unemployment

rates of African Americans and Latinx with disabilities (16.6% and 12.5%) were two times that of members from these racial/ethnic cohorts with no disabilities (8.1% and 5.6%), respectively. State vocational rehabilitation agency (SVRA) level data corroborate the BLS' disparity findings. For example, Lukyanova and colleagues (2014) examined VR data from a mid-western state that included 2,122 African American and 4,284 White participants with mental disabilities. Their results revealed that African Americans were closed as non-rehabilitated more often than Whites and were less likely to be employed compared to Whites.

Individuals with disabilities from racially/ethnically diverse backgrounds, especially adult Latinx, Native American or Alaskan Natives, and African Americans also more often report fair or poor health (55.2%, 50.5%, and 46.6%, respectively) compared to non-Latinx Whites with disabilities (36.9%) who typically report good or excellent health (Wong & Miles, 2014). According to a National Healthcare Quality Report (NHQR) and National Healthcare Disparities Report (NHDR), Native Americans and Alaskan Natives received worse care than Whites on nearly 30% of quality measures and had worse access to care than Whites for 62% of access measures in 2010. Generally, people of color are in poorer health, experience more significant problems accessing care, are more likely to be uninsured, less likely to have a usual source of health care, and often receive lower-quality health care than other Americans (Horner-Johnson et al., 2014; Wong & Miles, 2014).

Recent forecast research indicates that such disparity trends are likely to endure due to on-going minority immigration trends. Moore, Wang, Eugene-Cross, and Washington (2016) entered nine years of national Rehabilitation Services Administration (RSA)-911 case record data on SVRA applicants and U.S. Census Bureau American Community Survey 1-year estimates on the foreign-born populations into the Vector Autoregressive and the Multivariable Grey Models to develop a three-year forecast of new minority application rate trends. Multivariable Grey Model three-year (FY 2015 to FY 2017) simulation results projected an upward curve trajectory in application percentage rate trends for new African American, Native American or Alaskan Native, Asian, and Latinx applicants. These findings confirm an on-trend and growing demand for services among a wide range of individuals with disabilities from diverse populations. Because of this national employment outcome crisis and service demand, individuals with disabilities from these target populations may remain marginalized as labor force participants for the unforeseeable future.

People with disabilities, in particular, experience significant obstacles such as high poverty, high unemployment rates, lower annual earnings, lower educational attainment, and inadequate access to housing, transportation, technology, and health care (Cross et al., 2015; Manyibe et al., 2012). These disadvantages are especially severe and chronic among people of color with disabilities when compared to their White counterparts. As members of these diverse populations and communities, African Americans, Native Americans or Alaskan Natives, and Latinx with disabilities often experience unique barriers, and they face additional barriers within their own respective racial/ethnic groups. These inequities are compounded by difficulties in access to culturally sensitive rehabilitation and health care programs and services (Horner-Johnson et al., 2014; Sarche & Spicer, 2008; Weaver, 2015).

The link between disparities and minority-serving institution R&D participation. Scholars contend that an important driver of these national disparities is the under-participation of minority-serving institutions (Manyibe, Moore, Aref, et al., 2017; Moore et al., 2015) and their researchers of color, including those with disabilities (Koh et al., 2011; Spong & Bianchi, 2018) in related R&D. Because historically R&D has been conducted by White investigators targeting primarily White research participants, the "gold standard" with regard to the scientific paradigm has tended to project incorrect assumptions about effectiveness when unquestionably transferred to members of racially and ethnically diverse groups (George et al., 2014). As such, their participation is important and can yield answers to questions worthy of scientific inquiry, particularly those with cultural nuances. These scholars are uniquely qualified as research producers given their recognition of culture as a contextual central explanatory variable rather than a discrete variable that can only be manipulated and controlled (Moore et al., 2015). Moreover, the underrepresentation of minority-serving institution-based researchers of color engaging in scientific research furthers the lack of knowledge needed to address these disparities (Zea & Bowleg, 2016).

Rapid Demographic Shifts

Rapid demographic shifts occurring in the U.S. signal the need for an expanded research role among minority-serving institutions (Flores & Park, 2013). The U.S. Census Bureau projects that the U.S. population would become more racially and ethnically diverse in the coming decades (Colby & Ortman, 2015). Minority-serving institutions will need to be relied upon to educate a higher percentage of these new Americans from minority backgrounds, and also generate new knowledge that provides answers to questions pertaining to these population shifts. Currently, African Americans, Latinx, and Native Americans and Alaskan Natives make up about 13.5%, 15%, and 1.5% of the U.S. population, respectively. Additionally, Asian Americans, including Pacific Islanders, make up approximately 5% of the total population. The Pew Research Center reported that Latinx accounted for more than half (54%) of total U.S. population growth from 2000 to 2014. The population of African immigrants increased from 881,000 in 2000 to 2.1 million in 2015, accounting for 4.8% of the U.S. immigrant population (Anderson, 2015). The U.S. Census Bureau projects that the U.S. will become a plurality nation by 2044 (Colby & Ortman, 2015).

Diversification of the Scientific Workforce

Although scholarly works have clearly documented that diversity matters (Bull et al., 2015; Couch et al., 2015; Lewis et al., 2009), the federal disability/health and rehabilitation enterprise lacks the critical mass of researchers at minority-serving institutions available to conduct culturally competent R&D that address complex problems (Interagency Committee on Disability Research [ICDR], 2014). Moreover, there is a dearth of well-trained researchers of color in the field. In a 2014 Federal Interagency Committee on Disability Research (ICDR) report entitled *Creating a Sustainable Interagency Coordination Network on Disability Research,* panel experts recommended increasing the number of researchers of color, including those with disabilities, to build overall research capacity and interagency collaborations across the federal agency landscape and alleviate disparities that

disproportionately affect people of color with disabilities. These federally driven efforts aimed at collecting stakeholder perspectives underscore the magnitude of the problem, and the need to remain vigilant in the generation of community-based perspectives on new research capacity building models and interventions to address this shortage. Minority-serving institution participation as agency partners is thus warranted to help further develop diversity within the scientific workforce and stimulate multicultural R&D. Indeed, studies (Bernal, & Ortiz-Torres, 2009; Moore, Manyibe, Sanders, et al., 2017; Zea & Bowleg, 2016) have shown that researchers tend to work on areas that are of most interest to them. As such, faculty scholars at these institutions who generally have close sociocultural connections and understanding of communities of color tend to focus their efforts on issues of critical importance to communities of color. Research teams with broader cultural knowledge and viewpoints can generate highly innovative and robust solutions to multifaceted challenges (National Academies of Sciences, Engineering, and Medicine, 2017).

In natural ecosystems, rich biodiversity is considered an essential element for bionetwork productivity (Pinto et al., 2014), where each species, regardless of size, has an important mutually inclusive role to play. Healthy biodiversity is also considered a sign of sustainability. Likewise, involving more minority-serving institutions in disability/health and rehabilitation research could increase opportunities for culturally appropriate interventions, the promotion of socio-economic development for all, and ultimately enrich and advance the R&D enterprise/ecosystem. These institutions not only provide progressive learning spaces for intellectual and personal growth, but are also positioned to become the next frontier of research (Zea & Bowleg, 2016). Building research abilities could ensure that they continue to represent a key source for increasing the pipeline for scientific workforce diversity (Rogers, 2012). Minority-serving institution scientific capacity building is regarded as one of the most cost-effective and sustainable means of diversifying the scientific workforce, ensuring a high-quality supply of well-trained researchers of color, and mitigating the shortage of investigators in the U.S. over the long term (Harmon, 2012).

Diversity in the scientific workforce is also warranted as the knowledge generated from disability/health and rehabilitation R&D may significantly influence disability and health policy, shape standards of practice, and develop new innovations (Manyibe et al., 2015; Moore et al., 2012). Increasing the participation of investigators of color in all stages will ensure that knowledge and its methods of inquiry are not disconnected from people of colors' history, cultural context, and worldview (Manyibe et al., 2015; Moore et al., 2012; Owusu-Ansah & Mji, 2013). Other study findings (i.e., Bernal & Ortiz-Torres, 2009; Moore, Manyibe, Sanders, et al., 2017) have suggested that involving minority-serving institutions in research can also improve people of color research participation. For example, African American participation in clinical research is much lower than Whites (Institute of Medicine [IOM], 2009; Zea & Bowleg, 2016). Such poor participation rates are due to African Americans' strong distrust of the researchers because of a history of exploitation and lack of access to the research community (Fisher & Kalbaugh, 2011; IOM, 2009; Zea & Bowleg, 2016). Thus, one might hypothesize that people of colors' participation shortage in disability and health research is partly due to the

underrepresentation of researchers of color. Building the research training pipeline and research capacity of the institutions with the greatest fertility for producing such research scientists (i.e., minority-serving institutions) represents a cost-effective and sustainable means of diversifying the scientific workforce, which could inevitably lead to better science, a key ingredient to reducing disability/health and rehabilitation inequities (Manyibe et al., 2015; Moore et al., 2012).

Socioeconomic Benefits

Although not all gains can be measured in dollars, determining the potential return on investment is a major consideration when making major research capacity building and infrastructure investment decisions. The question that then arises is whether investing R&D and research capacity building dollars at minority-serving institutions is a prudent decision? Without venturing to answer this question in detail, what is clear is that they remain significantly underfunded in light of the important role they play in the U.S.' social and economic landscape. Minority-serving institutions' importance is demonstrated across various contributions. First, they produce graduates who populate the nation's disciplinary professional ranks such as health, rehabilitation counseling, law, medicine, science, and technology; and become industry and military leaders. Second, they contribute substantial economic benefits to the communities where they are located. For example, a landmark study, *HBCUs Make America Strong: The Positive Economic Impact of Historically Black Colleges and Universities*—commissioned by the UNCF, detailed the Return-On-Investment (ROI) of HBCUs (UNCF, 2017). According to this study "each dollar spent on, or by, an HBCU and its students has significant "ripple effects" across a much wider area. That means heightened economic activity; more jobs. Stronger growth. Stronger communities" (UNCF, 2017, p. 4). Undeniably, some communities largely depend on these institutions for job creation, tax revenue generation, economic growth, and resources such as libraries and venues for cultural events (Cunningham et al., 2014; Espinosa et al., 2018; UNCF, 2017).

The strategic benefits of investing capacity building dollars at these institutions for society cannot be measured in monetary terms alone. There are moral and social justice (i.e., the fair, equitable, and appropriate distribution of resources) imperatives that must be part of the discourse when making investment decisions directed at higher institutions of learning. For example, such investments at minority-serving institutions can have external impacts on the community's psychological and spiritual well-being, cultural renaissance, social education (Bull, 2015), enjoyment of civil liberties, and reduced crime rates, and literary speaking, its survival. In other words, there are clear economic and societal advantages that could be linked directly to investments in human capital and other research infrastructures at minority-serving institutions. This unambiguous reality has led many scholars, policymakers, and other disability and health stakeholders to conclude that strengthening their research capacity is one of the undisputable strategies to promote the vitality of the scientific community and socioeconomic prosperity for all segments of the American society (Moore et al., 2012). Such an understanding is particularly important because the U.S., just like many countries, recognizes that high levels of knowledge and skills are essential to its success. Yet, social benefits are seldom taken into account or measured when R&D and research capacity building investment decisions are made. Federal

government grant-making agencies (e.g., NIDILRR) should therefore prioritize spending on investment in minority-serving institutions' infrastructure and human capital via education and research skill development.

Equity in Research Funding

To address persistent disability/health and rehabilitation inequities, the field needs methodologically rigorous evidence-based research findings and dissemination and translation of new knowledge to inform policy and direct public investments, and develop assistive technology innovations. However, the expertise and perspectives of researchers based at minority-serving institutions are often under-represented in policy dialogues (Walters & Simoni, 2009), in part because of skewed funding tendencies in federal research agencies' investment portfolios (e.g., NIDILRR, NIH, AHRQ, and NSF). Available evidence contained in studies and government reports show that these institutions and their faculty scholars continue to be underrepresented (Moore et al., 2012; Walters & Simoni, 2009). For example, in 2014, each of the four top PWIs received more revenue from grants and contracts than all four-year HBCUs combined. John Hopkins University alone received $1.6 billion. On the other hand, 89 four-year HBCUs collectively received $1.2 billion from grants and contracts (Toldson, 2016). In FY 2017, funding for R&D to universities and colleges increased 4% to $29.8 billion. Paradoxically, funding to HBCUs for R&D declined 9%. High-Hispanic-enrollment institutions (HHEs) received $1.5 billion for R&D, up 3% from the FY 2016 total (Pece, 2019). Furthermore, in FY 2019, not a single HBCU or TCU was ranked among the top 50 NIH-funded universities (including medical schools), research institutions, and teaching hospitals. Moore and his colleagues' (2012), funded through a Delta Sigma Theta Sorority, Inc. Distinguished Professor Endowed Chair (DPEC) award, corroborated this funding discrepancy. They reported that HBCUs access disparate levels of NIIDILRR investments; of the 229 observed "grantees" across seven different funding mechanisms in fiscal year (FY) 2010, none were HBCUs. In an effort to better comprehend these inequalities, Ginther et al. (2011a) drilled down further from the institutional status into the racial strata finding inequities among individual researchers who apply for NIH agency grants; African American/black applicants were 10 percentage points less likely to receive an R01 award compared to White applicants after controlling for demographics beyond race, education and training, employer characteristics, NIH experience, and research productivity. These funding disparities experienced by minority-serving institutions and minority researchers cannot be ignored in the research capacity building discourses.

Researchers (Ginther et al., 2012, 2011b) assert that a complex interplay of factors contributes to these disparities, not the least of which is institutional bias, as evidenced in persisting research funding inequities. Because of disparities in research funding, researchers at minority-serving institutions might find it challenging to improve their research skills, access research mentors/leaders, establish peer national and international networks, publish in high impact journals, make presentations at national and international conferences, and meaningfully contribute to policymaking processes. Additionally, such funding inequities often result in poor research infrastructure (e.g., buildings, equipment, information technology, databases, and data analysis and management software), resources, and opportunities for

participating in regional, national, and international R&D partnerships, among others. This state of affairs calls for social justice actions, designed to eliminate obstacles to equal opportunity in obtaining federal and private funding. One of the best strategies to reduce racial/ethnic disparities is to address discrepancies in the distribution of research funds to institutions of higher learning (Manyibe et al., 2015; Moore et al., 2015) using equity principles (i.e., taking into account historical disadvantages) when making funding decisions. More specifically, federal research agencies should develop joint initiatives designed to not only increase R&D investments at these institutions, but also ensure they receive fair treatment and an equitable share of research capacity building and R&D investments based on the social justice paradigm.

Overview of the Study

Purpose of the Research and Evaluation Questions

The intent of this multi-method study was to evaluate the Institutional Research Capacity Building and Infrastructure Model (IRCBIM), an emerging integrated approach implemented at five different minority-serving institutions to help strengthen their disability/health and rehabilitation research capacity (i.e., research infrastructure and faculty members' and students' research skills [methodology and grant-writing]) and stimulate scientific productivity. The following research question was addressed: How did participants evaluate the Institutional Research Capacity Building and Infrastructure Model (IRCBIM)? To answer this key outcome question, the following evaluation questions guided the study:

1. Which research capacity building model components are more effective for building minority-serving institution research capacity and infrastructure?
2. What is the efficacy of including these strategies and methodologies in training early-career investigators involved in research with people of color with disabilities?
3. How do mentors and Fellows describe their experiences?
4. What were the advantages and challenges?
5. Which strategies or components can be considered for adoption by federal research funding agencies (e.g., NIDILRR)?
6. Which strategies and/or methodologies can be considered for application at other minority-serving institutions?

The section that follows provides an overview of the structural empowerment and critical mass theories, which served as our basis for understanding this assessment of IRCBIM.

Theoretical Lenses for Understanding the Capacity Building Model Design

The structural empowerment (Kanter, 1993) and the critical mass (Carrigan et al., 2011; Centola, 2013a) theories provided a conceptual basis for designing, planning, and implementing IRCBIM. This structural empowerment model postulates that the structure of the work environment is an important correlate of employee attitudes and behaviors in organizations and that perceived access to power and opportunity structures relate to their behaviors and attitudes (Kanter, 1977; Lewis & Simpson, 2012).

According to Kanter, individuals display diverse behaviors depending on whether certain structural supports (i.e., power and opportunity) are in place. The structural empowerment theory identifies six core conditions required for empowerment to take place; opportunities for advancement, access to information, access to support, access to resources, formal power, and informal power (Kanter, 1993).

In the context of research, opportunity refers to self-determination and the availability of opportunities to develop research skills and knowledge. Information relates to the data, technical knowledge, and expertise needed to execute high-quality research activities. Support refers to guidance, feedback, and direction received from subordinates, peers, mentors, sponsors, and supervisors to increase research productivity. Finally, resources indicate one's capacity to acquire materials, supplies, equipment, money, personnel, research assistants, and time needed to achieve institutional research imperatives (Kanter, 1993). Structural empowerment theorists believe that meeting these conditions result in increased feelings of autonomy, higher levels of work performance, job satisfaction, self-efficacy, and increased institutional commitment. In addition, the theory postulates that employees' access to or the support of organizational structures is more important to their work performance than personal qualities (Kanter, 1977; Lewis & Simpson, 2012). This may be especially true in the case of minority-serving institutions that have been historically excluded as grantees across federal disability/health and rehabilitation landscape, and thus oftentimes lack the requisite resources and expertise to build adequate research infrastructures and capacity. Based on this theory, these institutions' research infrastructure and access to federal R&D dollars are considered as important to their scientific participation and performance as their investigators' personal intrinsic attributes such as research skills (i.e., grant writing and research methods) and self-efficacy.

Contrary to the traditional research capacity building perspective emphasizing research skill building as the sole intervention (Moore et al., 2012), the structural empowerment theory lens view supports the notion that research infrastructure enhancement at minority-serving institutions is just as important, if not more significant. In short, this viewpoint denotes that these institutions cannot achieve high research productivity without sufficient and supportive systems (e.g., office of sponsored programs, institutional review boards, executive administrators, comptroller offices). Therefore, efforts designed to empower their faculty members and students to participate optimally in R&D must focus on enhancing research governance structures and their capabilities.

The critical mass theory was used to illuminate the need for minority-serving institutions and their affiliated researchers to assume more than tokenistic roles in R&D participation across the federal research agency enterprise. Scholars and experts across professions generally agree that this theory could be used as a tool to bring about cultural transformation in academic institutions (Carrigan et al., 2011; Collins et al., 2010; Excelencia in Education, 2017; Torchia et al., 2011). From a minority community perspective, the critical mass theory posits that a minority group will influence change and group interactions when it reaches critical mass (Excelencia in Education, 2017). The theory can be defined as "the level of activity above which a behavior becomes self-sustaining" (Centola, 2013b, p.

239). For the purpose of this study, we define critical mass as the number of minority-serving institution affiliated investigators with up-to-date R&D skills needed to compete for federal R&D grant projects and conduct rigorous studies, and thus help alleviate disparities. In other words, until researchers of color increase in number beyond "token status," disability/health and rehabilitation inequities will continue to persist. Specifically, strategic goals aimed at addressing this problem might only be achieved once a critical mass of these researchers and investigators of color achieve adequate representation within the disability/health and scientific community. This is especially true because research leaders of color play a significant role in recruiting, mentoring, and socializing young investigators and students of color into the research enterprise (Moore, Aref, Manyibe, et al., 2016).

Conversely, the absence of a critical mass of minority researchers can demoralize early- career investigators of color and signify that obtaining a research grant or getting published is an almost impossible undertaking. In her seminal work on the subject, Kanter described the importance of reaching a critical mass as follows:

> Yet it seems clear that numbers, especially relative numbers, can strongly affect a person's fate in an organization. This is a system rather than an individual construct—located not in the characteristics of the person, but in how many people, like that person in significant ways, are also present (Kanter, 1977, p. 241).

These theories are not mutually exclusive. Inherent in both of them is the notion that producing desired change (i.e., alleviating disparities) is a complex effort that is influenced by the intersectionality of internal and external factors. Moreover, these theories support the supposition that poor minority-serving institution research participation and performance could be addressed through research capacity building efforts and new models that empower them to build their research infrastructure systems and capacity.

Research Capacity Building Model Intervention

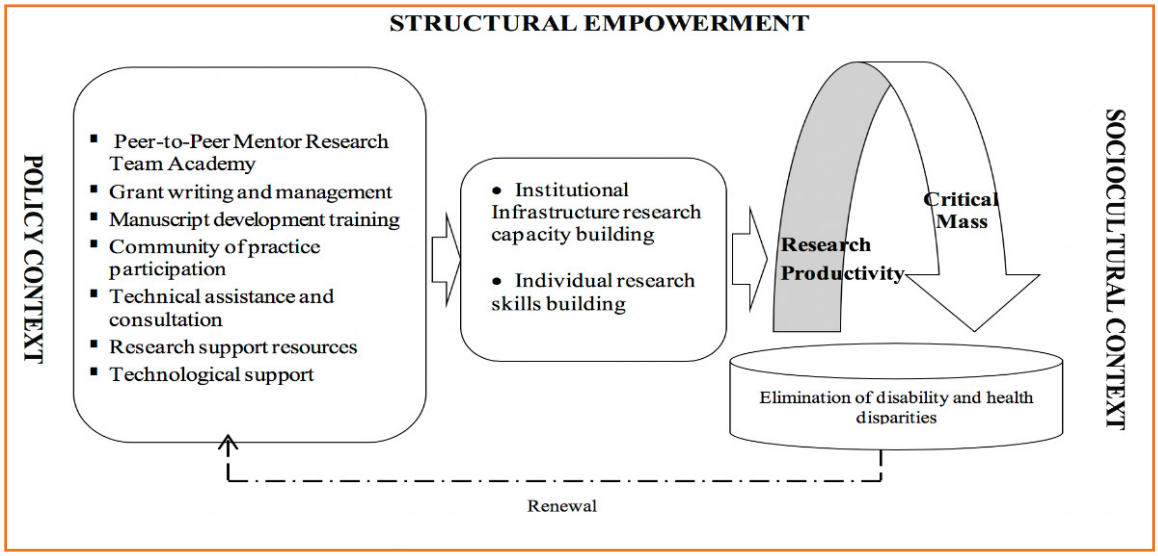
The Institutional Research Capacity Building and Infrastructure Model (IRCBIM), as shown in figure 1, was officially launched on December 4, 2014 (i.e., residency phase), whereby final data collection was completed on May 31, 2018; reflecting an approximately 3 ½ year field-test. The LU-RRTC, in conjunction with the ICI, designed the model for the express purpose of empowering minority-serving institutions to overcome poor R&D participation and related challenges. The model embraces a new paradigm to research capacity building, which holistically addresses individual, institutional, and systems factors that facilitate R&D participation and productivity at many of these institutions. The model also takes into account policy, sociocultural, and political contexts, which are some of the major drivers of capacity building efforts at higher learning institutions. The goals of the IRCBIM were three-fold:

1. To mentor and provide Fellows (i.e., faculty members) with in-depth knowledge of the research process and equip them with practical skills for the design and conduct of quality research studies.

2. To systematically build the capacity and research infrastructure of minority-serving institutions to undertake scientific studies that produce new knowledge, develop new ideas, and experiment with innovations that lead to improved experiences and outcomes among people of color with disabilities.
3. To create awareness at these institutions about federal research agencies that fund disability and health research to stimulate R&D interest and activities.

Research capacity building activities are expected to generate critical new knowledge with the potential to solve contemporary disability/health and rehabilitation problems experienced by people of color. In contrast to many previous capacity building models that consisted of segmented trainings and workshops focused on enhancing individuals' research skills (Moore et al., 2012), IRCBIM uses a whole system perspective to comprehensively address inadequate infrastructure, policies and practices, systems, and individual characteristics that hinder research participation and productivity. In addition, the model was designed to cultivate institutional culture that supports research, hence the pipeline infrastructure for developing the research talent and production of future research leaders. IRCBIM aims to build the research capacity of individual minority-serving institutions that have been historically excluded from the federal research enterprise. The aim is to develop these institutions as producers of translational R&D germane to the local community and provide evidence-based solutions that can help address disparities experienced by people of color with disabilities.

FIGURE 1.
A Promising Conceptual Framework: Institutional Research Capacity Building and Infrastructure Model (IRCBIM) for Improving Disability/Health and Research Capacity at Minority-Serving Institutions.



SOURCE: Adapted from "A disability and health institutional research capacity building and infrastructure model evaluation: A tribal college-based case study," by C. L. Moore, E. O. Manyibe, P. Sanders, F. Aref, A. L. Washington, & C. Robertson, C. Y. (2017). *Rehabilitation Research, Policy, and Education, 31*(3), 309–336. Adapted with permission.

Intervention Components

The IRCBIM consisted of the following seven intervention components: (a) Peer-to-Peer Mentor Research Team Model/Academy (hereafter referred to as the Academy), (b) Grant-Writing

and Management Training, (c) Manuscript Development, (d) Communities of Practice, (e) Technical Assistance- Infrastructure Issues Consultation, (f) Research Support Resources, and (g) Technical Support and Consultation. Activities embedded in each component were designed to empower participating institutions to conduct innovative disability/health and rehabilitation research that generates new knowledge to help alleviate contemporary inequities. The components represent structural empowerment and critical mass elements, which are consistent with "a whole system" approach that calls for strategies designed to address individual and institutional research infrastructure issues. The components are multifaceted and interconnected and focus on developing well-functioning and sustainable research environments, which in turn can lead to the development of a robust research culture and increased research productivity. This approach also takes into account socio-cultural and policy contexts that drive or hinder research capacity building efforts. Notably, the model acknowledges that policy and the surrounding social and cultural context as well as the institutional environment influence research capacity building. Common characteristics, as reflected in Table 2, reported to guide successful research capacity building programs (Cooke, 2005; Frontera et al., 2005; Manyibe et al., 2015; Moore et al., 2012), best practices in mentoring (Manyibe et al., 2015; Nick et al., 2012), key weaknesses identified by experts participating in NIDRR's 2011 RCB Summit (NIDRR, 2011), recent relevant research study findings (Aref et al., 2017; Manyibe, Moore, Wang, et al., 2017; Moore, Manyibe, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017), and the project principals' personal experiences and "inside" knowledge of minority-serving institution research environment nuances helped to inform the development of the model.

TABLE 2. Principles Guiding Capacity building and Corresponding IRCBIM Components

Research Capacity building Guiding Principles	Institutional RCB and Infrastructure Model (IRCBIM) Intervention Components
Strong interdisciplinary focus	Peer-to-Peer Mentoring and Community of Practice
Strong institutional support (financial and otherwise)	Technical Assistance and Consulting and Research Support Resources
Infrastructure supports research and teaching	Technical Assistance and Consulting
Explicit, ongoing strategic planning process	Technical Assistance and Consulting
Provision of academic leadership and mentoring	Peer-to-Peer Mentoring, Technical Assistance and Consulting
Use of incentives to reward success	Technical Assistance and Consulting
Use of technology and basic science approaches in rehabilitation research	Technology Support Consultation
Identify and mentor individuals early to orient them toward a research career	Peer-to-Peer Mentoring, Grant Writing and Management Training, Manuscript development Training, Community of Practice
Recruit junior research faculty members	Technical Assistance and Consulting
Recruit the right people into the faculty	Technical Assistance and Consulting
Mentor faculty and give them the appropriate infrastructure	Peer-to-Peer Mentoring, Grant Writing and Management Training, Manuscript development training, and Research Support Resources
Provide necessary start-up resources to develop and retain researchers	Research Support Resources
Help junior faculty avoid common pitfalls that derail academic careers	Peer-to-Peer Mentoring

Source: Chan and Jette cited in NIDRR RCB Summit Report (2011)

The structural empowerment and the critical mass theories were considered important theoretical frameworks for conceptualizing and developing core intervention components and activities. In addition, the model was customized to support scientific epistemologies and ontologies that are related to traditionally underserved populations. This is in recognition of the fact that the civilizations of minority groups are replete with cultural knowledge that is rooted in local cultures and everyday lived experiences (Braun et al., 2013; Shreve, 2015). A brief description of IRCBIM intervention components follows.

Peer-to-Peer mentor research team model/academy. The Academy, a core intervention component of the IRCBIM as seen in Table 3, was a 46-month innovative, integrated, and culturally relevant training approach designed to develop current disability and health research talent and leadership. In particular, this mentorship intervention focused on enhancing participating Fellows' research skills (e.g., research design, data collection, and analysis, knowledge translation) through research mentorship. In the model, mentoring is considered across groups (i.e., between fellow research team cohorts and mentor panels) and within fellow research teams for building early-career investigators' research skills and self-confidence.

TABLE 3. Phases of the Peer-to-Peer Mentor Research Team Model Indicating Duration and Sample of Research Activities

Phases	Project	Research Activities
Residency phase	Orientation	Participate in program orientation sessions, participate in research capacity training workshops, Fellows meet with mentors and begin matching process.
Remote Contact I: Research project	Research project	Conceive and develop research project, participate in online trainings, make presentations, receive mentorship and feedback
Consultative Contact Phase I: Research project	Research project and manuscript development	Participate in disability, health, independent living, and rehabilitation research trainings, document and report progress, receive mentorship and feedback, complete research project and submit manuscript for publication consideration.
Remote Contact Phase II: Research grant proposal	Proposal development	Receive intensive grant writing and management training, start developing research grant proposal, document and report progress, and receive mentorship and feedback.
Consultative contact phase II: grant proposal	Proposal Development	Participate in research trainings, document and report progress, complete and submit proposal to NIDILRR, receive mentorship and feedback.
Research leadership institute	Leadership Development	Learn research leadership concepts and skills, make presentations on projects, network with research leaders and other Fellows, receive mentorship and feedback.
Final Completion phase	Revision Research and Proposal Project	Tie up loose ends on research agenda, complete survey, participate in exit interview, receive mentorship and feedback, conduct graduation ceremony.

Source: Reprinted from "An emerging conceptual framework for conducting disability, health, independent living, and rehabilitation research mentorship at minority-serving institutions", by Manyibe, E. O., Moore, C. L., Aref, F., Washington, A. L., & Hunter, T., 2015, *Journal of Rehabilitation, 81*(4), p. 32.

The program was also tailored to enhance research culture, expand the pipeline for producing future minority-serving institution affiliated research leaders, and advance the state-of-the-science (Manyibe et al., 2015; Moore, Manyibe, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017). Furthermore, the mentorship facilitated a unique experience that not only sought to enhance Fellows' research skills through practical research participation, but also integrated Indigenous worldviews and knowledge into the training. Additionally, the mentorship ensured that Fellows, especially those at TCUs, learned and

developed their scientific capacity in Indigenous research principles and methodologies. The mentorship model was piloted at the University of Maryland-Eastern Shore (HBCU) between the dates of April 2014 and May 2015. The results were published as a case study in *Rehabilitation Research Policy and Education* (Moore, Manyibe, Aref, et al., 2017) and used to refine the intervention and its components before being implemented across the five participating institutions. Table 4 shows the demographic characteristics for Academy Fellows at baseline and post-intervention phases of study.

TABLE 4. Demographic Characteristics of Academy Fellows at Baseline and Post-intervention

Variable	Baseline *n* (%)	Post-intervention *n* (%)
Gender		
Male	6 (43)	6 (33)
Female	8 (57)	12 (67)
Race/Ethnicity		
Black/African American	5 (36)	6 (33.3)
Asian	-------	2 (11.1)
Hispanic or Latinx	2 (14)	3 (16.7)
White	5 (36)	5 (27.8)
Native American or Alaska Native	2 (14)	2 (11.1)
Disability Status		
Yes	2 (14)	------
No	------	------
Institution Affiliation		
Historical Black College and University (HBCU)	6 (43)	6(33.3)
American Indian Tribal College and University (TCU)	2 (14)	2(11.1)
Hispanic-serving Institution (HSI)	6 (43)	10 (55.6)
Position		
Faculty Academy Fellows	14 (100)	
Marital Status		
Single, never married	2 (14)	3 (16.7)
Married	12 (86)	14 (82.4)
Divorced	------	1 (0.9)

Grant-writing and management training. A fundamental intervention component of IRCBIM was the grant-writing and management training. The training was designed to increase the number of minority-serving institutions affiliated faculty scholars who have the required skills to write competitive and winning federally-funded research proposals and create awareness about federal research funding opportunities (e.g., NIDILRR and NIH). The RRTC, in collaboration with ICI conducted grant-writing webinars. In addition, we conducted grant writing and management training on campus and provided individual consultations. The training provided a broad overview of the grant writing process. The topics usually covered included the fundamentals of successful grant writing, general preparation of the grant application (i.e., specific aims, research design, budgets, analysis of reviews and strategies for rebuttal and re-application); roles and responsibilities of the principal investigator, CO-PI, and other project staff, establishing collaborations and negotiating sub-contracts; post-award management essentials; and an overview about the various available funding mechanisms within NIDILRR and other federal research funding agencies. The mentors reviewed proposals and provided Fellows with critical feedback

before submission for funding consideration. Guest presenters with a variety of experiences such as cultural competency, were invited to present workshops/webinars on the state-of-the-art grant-writing strategies. Senior federal research funding agency officials from NIDILRR also presented on their funding priorities, mechanisms, panel review processes and opportunities available to faculty members at minority-serving institutions during LU-RRTC organized conferences and/or meetings.

Manuscript development training. A core intervention element of the model included training participants on how to develop manuscripts that could be submitted for publication consideration in peer-reviewed professional and trade journals. The publication of a manuscript containing new ideas/concepts, theories, and/or empirically driven findings represents the "gold standard" as a scientific performance measure in academia as well as an indicator of future productivity potential (Moore, Manyibe, Sanders, et al. 2017). The culmination of one's hard work in the form a refereed publication that shares findings with the scientific community, policy makers, and other stakeholders has various personal rewards and increased prestige (Ranjan et al., 2016). Fellows participated in two trainings facilitated by leading scholars in the field to help them prepare to submit their manuscripts containing findings a special issue publication in a referred journal. Their six different manuscripts were submitted and eventually accepted in a 2017 special issue publication (Volume 48, Number 4) in the *Journal of Applied Rehabilitation Counseling* titled "Vocational Rehabilitation Experiences of Vulnerable Racial and Ethnic Populations: A Multi-site Minority-Serving Institution Peer-Mentor Research Team Approach."

Communities of practice. Unlike research teams that were designed to achieve certain goals, this community of practice was designed to allow Fellows to share ideas and learn how to conduct research that integrates the worldview and cultural knowledge that is embedded in the everyday lived experiences of minority groups. The goal was to learn ways to generate new knowledge that could improve rehabilitation outcomes among individuals with disabilities from traditionally underserved racial and ethnic minorities. A community of practice is a group of people bound by a shared interest, purpose, concern, or practice, who often collaborate to achieve individual or group objectives (Bezyak, Ditchman, & Chan, 2013; Wegner, 2002). Building a community of practice among researchers at minority-serving institutions is recognized as one potentially key strategy for promoting sustained research capacity building (Manyibe et al., 2015). The community of practice was based on the distributed intelligence framework and the theories of knowledge, which postulate that knowledge is a property passed by groups of people over time in shared practices and not a cognitive residue in the head of an individual (Bezyak et al., 2013; Wenger, 2002). Therefore, the community of practices provided Fellows space to share their unique research experiences, opportunities, and challenges.

Technical assistance-infrastructure issues consultation. As teams executed projects, a critical success factor was to provide study participants with the necessary technical assistance and consulting services. These services included facilitating strategic planning designed to provide a road map for disability and health research development at each institution, customized grant writing and management consultation, trainings designed to improve sponsored programs and IRB operations, manuscript development and peer review publication consultation, and developing research projects based on

various research principles and methodologies. We also provided intensive on-site consultations to minority-serving institutions on effective strategies that they could implement to balance faculty research agendas with teaching, service, advisement, administrative, and family responsibilities. A range of experts capable of providing culturally competent technical assistance were contracted to provide the required technical assistance services.

Research support resources. According to the structural empowerment model, access to resources is a condition that must be met for empowerment to be achieved. Access to resources refers to one's capacity to acquire materials, supplies, equipment, money, personnel, and time needed to achieve institutional imperatives (Kanter, 1993). Collaborating partners and institutions that implemented IRCBIM worked together to ensure that Fellows were provided with the necessary resources (e.g., peer reviewed articles) to support their research agenda.

Technological support and consultation. This support primarily involved assisting minority-serving institutions with data management and analysis software (e.g., SPSS, NVivo, and EndNote). According to the structural empowerment theory, information, which refers to the data (e.g., databases), technical knowledge, and expertise needed to execute functions demanded by ones' position must be present for empowerment to take place. Table 5 below shows IRCBIM intervention components and a summary of customized implementation strategies.

TABLE 5. IRCBIM Intervention Components and Illustrative Customized Implementation Strategies

Intervention Components	Implementation Strategies
Peer-to-Peer Mentor Research Team Academy	Mentor panels worked with 12 faculty scholars/Fellows from five different MSIs to carry out field-initiated research that addressed Priority C (experiences and outcomes of underserved populations). Research teams were required to publish results of research projects in professional journals as well as develop and submit a research grant proposal to NIDILRR's Field Initiated Program (research or development) or Mary Switzer Fellowship Program for funding consideration. **Mentoring/Training Framework** 1. Mentoring and Training: Mentors guided Fellows in developing a thematic line of scholarly research. 2. Mixed Methods Context: (a) Mentors provided Fellows with overview of mixed methods designs; (b) use Peer-to-Peer Research Mentors with mixed methods research and technical backgrounds (content, policy, practice and methods experts) to guide Fellows field-initiated research; (c) conduct multiple training seminars and Community of Practice topics on mixed methods designs. 3. NIDILRR's "Stages-of-Research" Framework & External Collaboration: Overview of NIDILRR's new "stages-of-research" framework and how it promotes the necessity to identify partners who can be involved in progressively bigger projects, which leads to external collaboration.
Communities of Practice	Research team members/Fellows (N = 12) at each of the five MSIs were required to participate in six community of practices. The Community of practices will be focused on the topics relevant to research barriers and methodologies and aimed to build participants research skills.
Institutional RCB and RI Training, Technical Assistance and Consultation	
Grant Writing and Management Training:	Faculty scholars, students, administrators, and staff participate in grant-writing training seminars focuses on enhancing basic grant-writing skills. Created awareness about federal funding opportunities.

Manuscript Development Training	Faculty scholars, students, administrators, and staff participate in manuscript development training, which focused on writing and publishing in peer-reviewed journals. Participants learn innovative ways to integrate research and manuscript development.
Technical Assistance—Infrastructure Issues Consultation	a. Teaching, student advisement, service, and administrative commitment balance. b. Sponsored Programs operations and functions. c. Research Infrastructure Strategic Planning: -Charting a vision for research infrastructure enhancement and productivity -Identifying objectives to be used to guide ME toward achieving the vision -Research assistants/administrative support operations -Institutional Review Board (IRB) efficient operation and function d. Grant-writing and Management consultation. e. Manuscript development and peer review publication. f. Building SVRA and MSI partnerships to increase SVRAs' capacity to serve people of color.
Research Support Resources	Provided mini-grant supplements- Seed monies to jump-start Fellows' research agenda. Funding could be used for release time, library resources, data management software (e.g., SPSS, NVivo) travel to present research, research assistant support, supplies to support Fellows agenda etc.
Technology Support and Consultation	Data management and analysis software (e.g., SPSS, NVivo), Endnotes, computers, etc.

The remainder of this monograph addresses methodology, findings, discussion, recommendations, and conclusion. Protocols used to guide the delivery of interventions to participating minority-serving institutions are located in Appendix A, while those followed to collect data are included in Appendix B.

Method

A mixed methods approach consisting of online surveys, document review, semi-structured face-to-face interviews, focus group discussions, and observations were used to evaluate the IRCBIM. Specifically, a concurrent triangulation design (Van der Roest et al., 2015) was employed, whereby quantitative and qualitative data were collected at the same time but analyzed separately. The aim was to obtain different but complementary data that would validate the overall results. The combined use of quantitative and qualitative approaches can produce greater insights and provide a fuller understanding of research problems than a single method approach (Van der Roest et al.). This process also allowed the researchers the opportunity to examine deeper meanings while producing generalizable results (Creswell & Plano Clark, 2011). It is also suitable for investigations designed to address complex problems where several factors (e.g., individual, institutional, and systems) are in constant interplay. An important goal of this study was to enhance confidence in the findings, increase validity, and complement findings through methodological triangulation.

Sample Setting

The study was conducted at five different minority-serving institutions. The two participating HBCUs included North Carolina Agricultural and Technical State University and Alabama State University. Founded between 1867 and 1891, these public HBCUs enroll a student population ranging from approximately 5,000 to 12,000 individuals annually. In addition to offering undergraduate, master's, and doctoral degree programs, they share many characteristics with other HBCUs. The University of Texas Rio Grande Valley, a public university, and Mercy College, a private institution, represented Hispanic-serving institutions in the study. Both institutions offer numerous undergraduate and graduate degree programs. They range in enrollment from an estimated 11,300 to 20,000 students

annually. Two different TCUs (i.e., Little Priest Tribal College and College of Menominee Nation) initially participated in the study. However, the College of Menominee Nation dropped out during the second year. Thus, we only reported findings for Little Priest Tribal College, which had a student population of about 150 students at the time of the study. The Winnebago Tribe of Nebraska chartered the college, which offers two-year associate degree programs and certificate programs. Like other TCUs, Little Priest Tribal College, in addition to its educational mission, serves as a community resource for crucial social services that foster Indigenous culture, languages, and traditions. These institutions, like many universities and colleges, consist of a complex set of units (e.g., academic units, athletics departments) arranged in a unique collection of relationships, which are frequently changing in search of equipoise and sustainability.

Study participants at these sites consisted of faculty, administrators (e.g., presidents, deans, and department chairs), staff (e.g., office of sponsored programs personnel), and students. All participants were 18 years of age or older. To account for attrition of participants (i.e., Academy Fellows, administrators/staff, and students) over time due to uncontrollable occurrences (e.g., promotions, transfers, and graduations), we used a sampling with rotation approach (Auranen & Nieminen, 2010) that allowed us to add new participants to the study after baseline. This approach is especially suitable for studies conducted at higher learning institutions where personnel changes are common. Sampling with rotation provides continuity of data and improves estimates of the population characteristics (Karna & Nath, 2015) by taking into account information already collected from participants who left the study prior to post-intervention data collection.

Procedures

In March 2014, a national call for IRCBIM applications was opened. As part of our recruitment strategy, we held an informational meeting in Atlanta Georgia on April 3-4, 2014 informing minority-serving institution-based administrators and faculty members about IRCBIM, its goals, and application procedures. On May 1, 2014, we held a pre-application teleconference for potential applicants where additional information was provided to participants and questions arising from prospective applicants were fielded and addressed. On September 1, 2014, the selection committee consisting of LU-RTTC and ICI researchers together selected six different minority-serving institutions (i.e., 2 HBCUs, 2 HSIs, and 2 TCUs) out of the eighteen that submitted complete applications as IRCBIM participants and field-test sites. The committee also selected two to three Fellows from each of the six institutions to participate in the peer mentorship intervention component of the model. The following inclusion criteria were used to identify eligible applicants:

1) Must be a minority-serving institution (i.e., HBCU, HSI, or TCU).
2) Must house a rehabilitation, health, or allied health academic and/or research program or teaching program in the social sciences.
3) Must be an accredited institution.
4) Must agree to sign a subcontract to participate in research capacity building and research infrastructure development activities.

5) Must commit to the Peer-to-Peer Mentor Research Team Academy Fellow responsibilities. Each institution selected was required to nominate 2-3 faculty members to participate in the academy.
6) If HBCU or HSI, must meet the Carnegie basic classification of baccalaureate college, master's college and university, or research university (high research activity). If TCU, must be Tribal College as classified by the Carnegie Foundation. Each selected institution was responsible for nominating Fellows (i.e., Peer-to-Peer Mentor Research Team Academy participants).

The selection committee used the following criteria to evaluate and select the participating institutions: (a) statement of need, (b) composition of selected Peer-to-Peer Mentor Research Team Fellows, (c) demonstrated or expressed interest in disability and rehabilitation research, (d) sub-contract to participate in research capacity building and research infrastructure development activities, (e) demonstrated commitment to outlined RRTC activities, and (f) overall quality of the application. Each institution's president nominated at least three faculty members in disability/health and rehabilitation areas to serve as Fellows. The committee scored and identified Fellows based upon these criteria: (a) affiliation with a minority-serving institution, (b) strong commitment to scientific inquiry focused on alleviating rehabilitation, independent living and health disparities among people with disabilities from traditionally underserved racial and ethnic populations, (c) the desire to collaborate with others, (d) possess a high value on setting and accomplishing goals, (e) willingness to learn and develop research skills, and (f) commitment to submit a research proposal to NIDILRR for competitive funding consideration. The goals, objectives, and expectations of the mentorship model were clearly outlined. Participation was voluntary. The appropriate IRB granted approval for conducting this study.

Needs Assessment

Before implementing IRCBIM, we conducted two different needs assessments; one completed by Academy Fellows and the other targeting administrators, staff, students, and faculty members. We also conducted a document review. The aim of the assessments and review was (a) to help us gain a better understanding about the institutions' unique research capacity building and research infrastructure development needs and (b) to help synthesize information used to develop data collection frameworks that assess research capacity and performance measures. We analyzed data (qualitative and quantitative) garnered from the needs assessment and document review of the institution's IRCBIM application. The analysis of data was accomplished across three broad research capacity building and research infrastructure areas (i.e., individual, institutional, and systems) under the following ten specific domains: (a) leadership, (b) structures, (c) collaboration, (d) external support, (e) access to resources, (f) research networks, (g) skills and knowledge, (h) ongoing learning, (i) participation, and (j) psychological wellbeing. The results showed that several interventions were needed to enhance research capacity and research infrastructure at the institutions. Based on the results, the LU-RRTC research team developed a "Plan of Action" to guide the delivery of customized interventions to the participating institutions. Consistent with IRCBIM, action activities were designed to address individual, institutional, and system issues. Accordingly, a range of intervention components shown in Table 6 were introduced to each institution's setting to address identified needs.

TABLE 6. A Summary of Interventions Delivered to IRCBIM Participating Institution

Institution	Summary of Interventions Delivered
Mercy College	Peer-to-peer mentor research team academy (e.g., research methods training [i.e., quantitative, qualitative, mixed methods]), grant writing and management training, manuscript development training, communities of practice (CoP), technical assistance-infrastructure issues consultation (e.g., research strategic planning, institutional review board [IRB] and office of sponsored programs [OSP] technical assistance [TA], building research networks and partnerships with state agencies [e.g., SVRA]), research support resources (e.g., peer reviewed journal articles access), technical support and interventions
Little Priest Tribal College	Peer-to-peer mentor research team academy (e.g., research methods training [i.e., quantitative, qualitative, mixed methods]), grant writing and management training, manuscript development training, communities of practice (CoP), technical assistance-infrastructure issues consultation (e.g., research strategic planning, institutional review board [IRB] and office of sponsored programs [OSP] technical assistance [TA], building research networks and partnerships with state agencies [e.g., SVRA]), research support resources (e.g., peer reviewed journal articles access), technical support and interventions
University of Texas Rio Grande Valley	Peer-to-peer mentor research team academy (e.g., research methods training [i.e., quantitative, qualitative, mixed methods]), grant writing and management training, manuscript development training, communities of practice (CoP), technical assistance-infrastructure issues consultation (e.g., research strategic planning, institutional review board [IRB] and office of sponsored programs [OSP] technical assistance [TA], building research networks and partnerships with state agencies [e.g., SVRA]), research support resources (e.g., peer reviewed journal articles access), technical support and interventions
Alabama State University	Peer-to-peer mentor research team academy (e.g., research methods training [i.e., quantitative, qualitative, mixed methods]), grant writing and management training, manuscript development training, communities of practice (CoP), technical assistance-infrastructure issues consultation (e.g., research strategic planning, institutional review board [IRB] and office of sponsored programs [OSP] technical assistance [TA], building research networks and partnerships with state agencies [e.g., SVRA]), research support resources (e.g., peer reviewed journal articles access), technical support and interventions
North Carolina A&T University	Peer-to-peer mentor research team academy (e.g., research methods training [i.e., quantitative, qualitative, mixed methods]), grant writing and management training, manuscript development training, communities of practice (CoP), technical assistance-infrastructure issues consultation (e.g., research strategic planning, institutional review board [IRB] and office of sponsored programs [OSP] technical assistance [TA], building research networks and partnerships with state agencies [e.g., SVRA]), research support resources (e.g., peer reviewed journal articles access), technical support and interventions

Data Collection

Purposeful sampling techniques were used to secure respondents to the online survey, key informants for face-to-face semi-structured interviews, and focus group participants. The data collection activities are described below.

Quantitative Data

A web-based survey (i.e., Minority-Serving Institution Research Capacity Building and Infrastructure Model Evaluation Survey) was used to collect data through PsychData, a software created to conduct online research, at the baseline and post-intervention phases. Consistent with research methodologists' suggestions (e.g., Creswell, 2013; Dillman et al., 2014), the information gathered through a comprehensive literature review, expert panel input, and piloting informed the design and development of the survey. The researchers also employed survey design principles and standards (Dillman et al., 2014) ensuring that the instrument was well structured and contained clear instructions and definitions, contact information, and provided explanations regarding the benefits to target population members. Two LU-RRTC National Advisory Panel Members with expertise in survey research design reviewed the instrument, and their feedback was used to further refine the questionnaire.

The survey included a demographic profile section and 145 items designed to evaluate specific aspects of the model. The survey used a five-point Likert type scale (strongly agree – strongly disagree), (very important – unimportant), or (almost never true – almost always true). Participants could also provide qualitative responses about their perceptions on elements of the model. Before launching the questionnaire, the key contact personnel at each participating institution received a one-week advance email informing them about an upcoming questionnaire. Consistent with the Tailored Design Method framework (Dillman et al., 2014), we sent six email reminders over 12 weeks.

An email inviting participation containing an embedded link to psychdata.com that provided secured access to the online survey was sent to 144 faculty scholars, administrators/staff, and students at baseline and 138 at post-intervention. The baseline survey was made available to them between October 29, 2014 and November 9, 2014, while the post-intervention survey was active from April 20, 2018 to August 27, 2018. A total of 61 completed the survey at baseline and 64 at post-intervention. Therefore, the response rate was 42.4% and 46.3% at baseline and post-intervention, respectively. Table 7 presents respondents' characteristics.

TABLE 7. Demographic Characteristics of Respondents at Baseline and Post-intervention

Variable	Baseline *n* (%)	Post-intervention *n* (%)
Gender		
Male	28(46.0)	18 (28.1)
Female	33(54.0)	46 (71.9)
Race/Ethnicity		
Black/African American	17 (27.9)	25 (39.1)
Asian	5(8.2)	3 (4.7)
Hispanic or Latinx	16 (26.2)	9 (14.1)
White	20 (32.8)	21 (32.8)
Native American or Alaska Native	1 (1.6)	6 (9.4)
Other (please specify)	2 (3.3)	
Disability Status		
Yes	6 (9.8)	6 (9.4)
No	55 (90.2)	58 (90.6)
Institution Affiliation		
Historical Black College and University (HBCU)	17(27.9)	26(40)
American Indian Tribal College and University (TCU)	5(8.2)	7(11)
Hispanic-serving Institution (HSI)	39(63.9)	31(49)
Position		
Administration/Staff	16 (26.2)	16 (25)
Faculty		
Academy Fellows	14 (23.0)	18 (28.1)
Non-Academy Fellow	20 (32.8)	21 (32.8)
Student	11 (18.0)	9 (14.1)
Marital Status		
Single, never married	14(23.0)	10(16)
Married	32(52.5)	45(71)
Living with someone in a marriage-like relationship	6(9.8)	1(1)
Separated	1(1.6)	2(2)
Divorced	7(11.5)	6 (10)
Widowed	1(1.6)	-

It is important to note that some also held administrative roles. The faculty scholars, and administration/staff represented the following academic and/or administrative units: counseling (rehabilitation/counselor education), health field (health & allied fields), academic affairs, social work, psychology, criminal justice, library, political science, and sponsored programs. To create this "intelligent" survey, we used a branching question (i.e., unconditional survey branching), which allowed respondents to answer only those questions that applied to them based on their responses to the screening question. Accordingly, those who identified themselves as administrators/staff or students on the screening question were allowed to skip the rest of the items after completing the first 32 items of the survey. Those who identified as faculty scholars' (i.e., faculty members who did not participate in the Academy and the Academy Fellows) were automatically allowed to complete the rest of the survey.

Qualitative Data

In-depth individual interviews. Key informants for the face-to-face semi-structured interviews were faculty members, students, and administrators/staff. Research team members developed the interview protocol with input from two LU-RRTC National Advisory Panel Members, whose expertise included qualitative research methods. The interview protocol contained open-ended questions relating to the IRCBIM model and was designed to elicit the participants' perspectives that could be used to evaluate IRCBIM intervention activities. Six research team members trained in interview techniques facilitated the interviews during a three-to-four-day on-campus site visit to each institution. Each interview was approximately 20 minutes. During interviews, participants were encouraged to speak freely about their experiences.

TABLE 8. Demographic Characteristics of Interview Participants During Site Visits

Variable	*N* (%)
Gender	
Male	15 (28.3)
Female	38 (71.7)
Race/Ethnicity	
Black/African American	21 (39.6)
Hispanic or Latinx	7 (13.2)
White	22 (41.5)
Native American or Alaska Native	3 (5.7)
Disability Status	
Yes	2 (3.8)
No	51 (96.2)
Institution Affiliation	
Historical Black College and University (HBCU)	17 (28)
American Indian Tribal College and University (TCU)	5 (8)
Hispanic-serving Institution (HSI)	39 (64)
Position	
Administration/Staff	23 (43.4)
Faculty	24 (45.3)
Student	7 (11.3)

Table 8 provides demographic information for the face-to-face interview key informants. Fifty-three participated across the five participating institutions between the dates of May 12, 2015 and May

1, 2018. Of these individuals, 24 (45.3%) were from HBCUs, 23 (43.4%) from HSIs, and 6 (11.3%) were from TCUs. A majority of these key informants were faculty members 24 (45.3%), followed by administrators/staff, and students. Of the administrators/staff, 5 were from the institutional review board (IRB), 7 from office of sponsored programs (OSP), 2 department/program chairs, 3 deans, including a dean of graduate programs, 1 president, 1 vice president for academic affairs, and 2 vice presidents for research. Two of the participants reported having a disability.

Focus groups. Two different focus groups were conducted to generate data about Academy Fellows' and mentors' experiences and viewpoints. The discussions were conducted during the Rehabilitation Research and Grant Writing Training and Technical Assistance Conference held on October 25-27, 2016, in Orlando, Florida to ensure the efficient use of resources. Research team members developed the focus group protocols, with input from two LU-RRTC National Advisory Panel members with expertise in qualitative research. The first focus group discussion was held on October 25, 2016 and consisted of 7 mentors. Of these mentors, 2 (28.6%) were African American, 4 (57.1%) White, and 1(14.3%) Asian American; 3 (42.9) were female and 4 (57.1%) were male; 5 (71.4%) were from a minority-serving institution and 2 (28.6%) from a PWI. Two mentors (28.6%) indicated that they had a disability. Four identified as professional senior researchers, two as full academic professors, and one as a research associate.

The second focus group discussion was facilitated on October 26 and consisted of 11 Academy Fellows; 4 (36.4%) were African American, 3 (27.3%) White, 2 (18.2%) Latinx, 1 (9.1%) Native American or Alaskan Native, and 1 (9.1%) Asian American; 8 (72.7%) were female and 3 (27.3%) were male; 4 (36.4%) were from an HBCU, 6 (54.5%) from an HSI, and 1 (9.1%) was from a TCU. Nine (81.8%) participants identified themselves as faculty and 2 (18.2) as clinical instructors; 9 (81.8%) had obtained a PhD while two (18.2%) had a master's degree. One of the Fellows reported having a disability.

Document review. A review of documents is an unobtrusive method, rich in representing the values and beliefs of participants (Maxwell & Granlund, 2011; Owen, 2014). As reflected in Table 9, we reviewed several hard copies and electronic documents (i.e., public records and artifacts) that were used to provide background context about the institutions' history, mission, and vision, and connection with the community (Maxwell & Granlund, 2011; Owen, 2014). Most of the documents were internal to institutions. Data gleaned from the documents were also used to corroborate observational and interview data as well as develop questionnaire evaluation questions.

Observation. We used observation, an ethnographic method of data collection to gain insight regarding each of the five participating institutions' research environment and culture. In addition, the research team used this procedure to help develop probing questions to be fielded with participants. Field notes were used to organize the data gathered from observations. Research team members documented their observations during a two-to-three day on-campus site visit to each institution. As Table 10 shows, these observations/site visits took place between the dates of May 12, 2015 and May 1, 2018. The study team used an observation protocol developed by the research team to document their observations.

TABLE 9. Documents Reviewed and Availability

Titles of Documents Reviewed	Availability
Institutions websites	Publicly available
Institution brochures	Publicly available
Institutional Research Capacity Building Needs Assessment	Not publicly available
Grant writing and Manuscript Development Training Reports	Not publicly available
Monthly Minutes between Researchers and Mentors	Not publicly available
Grant writing and Manuscript Development Consultant's Reports	Not publicly available
Institutional Research Capacity Building Infrastructure Model (IRCBIM) Application Packet	Not publicly available
Institutional Research Capacity Building Infrastructure Model (IRCBIM) Action Plan	Not publicly available
Expenditure Reports – Grantees	Not publicly available
Technical Assistance Satisfaction Survey	Publicly available
Research Capacity Building Strategic Plans	Publicly available
Institution Websites/Faculty Catalogs (2016)	Publicly available
Academic Catalogs	Publicly available
Community Needs Assessment	Publicly available
Application for Admission Packets	Publicly available
Tribal College, Journal of American Indian Higher Education, Spring 2015	Publicly available
Tribal College, Journal of American Indian Higher Education, Summer 2015	Publicly available
Tribal College, Journal of American Indian Higher Education, Fall 2015	Publicly available
American Indian Higher Education Consortium (AIHEC) Flyer	Publicly available

TABLE 10. Site Visit/Observation Dates and Research Team Members Conducting Observations

Name of Institution	Site Visit/Observation Dates	Site Visit Research Team/Observers
Little Priest Tribal College	May 12-13, 2015	Dr. Manyibe Dr. Davis Dr. Washington
	November 6, 2015	Dr. Washington Dr. Sanders
	April 18 - 20, 2018	Dr. Washington Dr. Manyibe Dr. Sanders
	April 30 - May 1, 2018	Dr. Washington Dr. Sanders
Alabama State University, Alabama	July 21- 22, 2015	Dr. Moore Dr. Washington Dr. Davis Mrs. Muhammad
	April 10-14, 2017	Dr. Manyibe Dr. Washington
	August 10, 2017	Dr. Moore Dr. Washington
	April 2, 2018	Dr. Davis Dr. Williams Dr. Washington
University of Texas Rio Grande Valley	March 19, 2018	Dr. Washington Dr. Williams Dr. Manyibe
Mercy College	July 29-30, 2015	Dr. Davis Dr. Washington
	April 14-16, 2016	Dr. Washington
	July 13-14, 2017	Dr. Manyibe Dr. Washington
	Mar. 27, 2018	Dr. Davis Dr. Washington

North Carolina A&T University	September 14-15, 2015	Dr. Manyibe Dr. Washington
	May 2-6, 2017	Dr. Washington
	March 12-13, 2018	Dr. Manyibe Dr. Ward-Sutton Dr. Washington Ms. Webb

Researcher as an instrument. All research team members (N = 11) were based at the LU-RRTC and identified as African American (n = 9), Native American (n = 1), or White (n = 1); and male (n = 6) or female (n = 5). Two research team members had a disability. Research team members either possessed a doctorate degree (n = 10) or were in a doctoral program (n = 1). In qualitative research, the researcher is also a data collection instrument (Bourke, 2014). With this understanding, we maintained informed reflexive awareness throughout the research process to contextualize our position. In this process, we discussed and addressed any biases and assumptions throughout data collection, analysis, and interpretation (Bourke, 2014).

Positionality. A central element in qualitative research is positionality, which represents the position that researchers adopt within a given study, a space in which objectivism (i.e., the epistemological belief that unbiased knowledge can be produced about any phenomenon just by following the scientific method) and subjectivism intersect (Bourke, 2014; Vanner, 2015). According to the positionality theory, researchers generally have multiple overlapping identities. In this study, the research team members were both "insiders" and "outsiders." These overlapping identities presented opportunities and challenges throughout the scientific process. We were "insiders" because of our minority-serving institution's lived experiences as academic researchers. Our identities as HBCU-based researchers and researchers of color, for example, provided the impetus for this study not only because we are close to the problem, but also due to the fact that we have also conducted research and published in refereed trade journals on topics related to research capacity building at these under-resourced institutions (e.g., Manyibe et al., 2015; Moore, Aref, Manyibe, et al., 2016). Such lived experiences allowed us to understand from multiple perspectives the associated research aspirations, challenges, and opportunities at minority-serving institutions.

On the other hand, our "outsider" position allowed us the opportunity to bring new perspectives into the research space. As our demographic information reflects, the research team was not a homogenous group; thus, further indicating that our social proximity to the research participants and the beneficial consequences were not the same. Individually, our positionalities are wide ranging. Because of this awareness, during research team meetings and within our individual spaces, we interrogated how our positionality (e.g., values, training, and social backgrounds) might impact the research process (Bourke, 2014; Vanner, 2015). In this process, we recognized our biases and addressed them to ensure that the credibility of the research process was maintained.

Data Analyses

Quantitative data. Quantitative data were analyzed using SPSS (Version 22). Descriptive statistics were used to examine the demographic characteristics of the samples and to analyze quantitative data.

Qualitative data. Consistent with qualitative methods, data collection and analysis took place simultaneously. Our method of data analysis involved using descriptive and evaluative coding of the interview and focus group discussion transcripts and documents selected for review. We audiotaped all interviews and focus group discussions, which were subsequently transcribed by a professional transcription service. We uploaded transcripts into an NVivo 12 database (a computer software tool used for qualitative analysis) for review and coding. Upon an initial review of the data, the research team worked together to develop a provisional coding structure. The analytic team utilized thematic analyses to code interview data for themes that emerged from the participants' accounts. The thematic analysis process included open coding, memo writing, and constant comparison of data, which are elements closely aligned with a grounded theory approach. The team discussed and resolved all disagreements. This cyclic process of data collection and analysis, which continued until saturation was reached, increased the trustworthiness and credibility of the findings. We also created an audit trail and used member checking of the transcripts to increase the credibility of the findings (Creswell & Plano Clark, 2011).

Findings

The study results are presented in two broad sections; quantitative and qualitative findings.

Quantitative Findings

The quantitatively derived findings were generated through an analysis of the data collected through the Minority-Serving Institution Research Capacity Building and Infrastructure Model Survey. These findings are presented in three parts. The first segment presents overall findings based on faculty scholars', administrators'/staff, and students' responses to Part I of the survey (Item 1-32). The second section presents results based on faculty scholars' (i.e., faculty members who did not participate in the Academy and the fellows) responses. Last, we present findings based on Fellows' responses broken out from other faculty scholars to provide results specific to Academy evaluation outcomes.

Faculty Scholars', Administrators'/Staff, and Students' Perspectives

Figure 2 depicts the overall baseline and post-intervention mean scores for specific IRCBIM domains as reported by faculty, administrator/staff, and student respondents. Table 11 shows descriptive statistics for specific variables under each domain. Remarkably, there was a positive

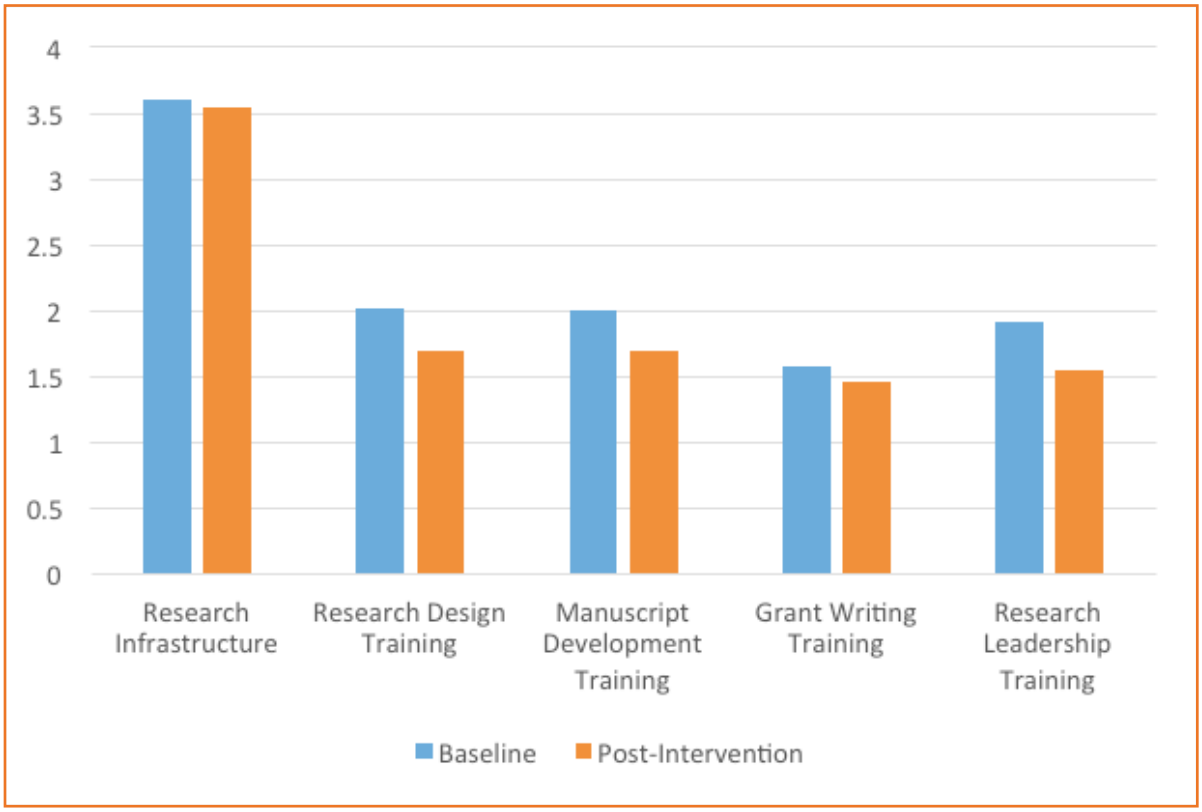
change between the two measurement phases. A decrease in mean scores between baseline and post-intervention segments indicated decreased capacity building need, which suggested increased capacity and/or improved research infrastructures across the domains. Conversely, an increase between the two measurements suggested decreased research capacity.

Research infrastructure. One of the aims of IRCBIM was to strengthen research infrastructures, which play an indispensable role in driving an institution's capacity to engage in robust research. Notably, our evaluation indicated that the overall need for specific research infrastructures (e.g., the need for a research strategic plan and to provide technical assistance to increase office of sponsored programs' effectiveness) decreased between baseline (M = 3.61) and post-intervention (M = 3.54). An examination of individual items within this domain revealed varying outcomes. The greatest change score difference yielded occurred in the need for a strategic plan that guides and promotes research capacity building for faculty, staff, and students from baseline (M = 4.16) to post-intervention (M = 1.72). Change occurred least in the need for institutional technological resources (e.g., computers and research software) at baseline (M = 2.71) compared to post-intervention (M = 1.78).

Research design training. The ability to design research is a critical aspect of the whole research process. To assess their need for research design training, respondents answered three questions. The overall need for research design training (e.g., quantitative and qualitative research design training) decreased between baseline (M = 2.02) and post-intervention (M = 1.69). The most striking change score difference occurred in need of qualitative data analysis training using NVivo from baseline (M = 2.39) to post-intervention (M = 1.58). Change occurred least in the need for quantitative research design training baseline (M = 1.86) to post-intervention (M = 1.72), and the need for quantitative data analysis (M = 1.94; M = 1.78; baseline and post-intervention, respectively).

Manuscript development training. All aspects of manuscript development (e.g., the need for conducting effective literature reviews) appeared to have changed between baseline and follow-up. Overall the need for activities related to manuscript development decreased from baseline (M = 2.00) to post-intervention (M = 1.69). Results indicated that the greatest change score difference was yielded in the need for training focused on conducting an effective literature review (M = 2.37; M = 1.80 baseline and post-intervention, respectfully). Least change occurred in the need for student-faculty research collaboration training (M = 1.57; M = 1.64, at baseline and post-intervention, respectively).

FIGURE 2.
Overall Baseline and Post-Intervention Mean Scores for Specific IRCBIM Domains as Reported by Faculty, Administrators/Staff, and Students



Grant writing training. Many investigators, especially early-career researchers at minority-serving institutions may find it very challenging to write competitive proposals. Accordingly, part of the evaluation focused on the need for grant writing training. The analysis of the responses indicated that the overall need for grant writing training (e.g., grant management training, understanding "behind-the-scenes" decisions that determine proposal acceptance and denial, and developing a working relationship with federal grant funding agencies) decreased between baseline (M = 1.57) and post-intervention (M = 1.45). The greatest change occurred in the need for training on developing relationships with federal funding agencies (e.g., NIDILRR) (M = 1.61; M = 1.41, at baseline and post-intervention, respectively), whereas least change occurred in the need for understanding "behind-the-scenes" decisions that determine ways successful proposal are selected (M = 1.53; M = 1.52, at baseline and post-intervention, respectively).

Research leadership training. In the survey, respondents were asked questions focused on the need for collaborative research, effective research teams, and time management (i.e., balancing teaching, research, service, and personal commitments) training. The evaluation indicated a positive change in this domain, as indicated by the decrease of mean scores from baseline (M = 1.92) to post-intervention (M = 1.55). The most striking change score yielded between the two measurements was for the need for time management and training domain (M = 1.96 and M = 1.56). The model considers the ability to lead as an important aspect of research capacity building at minority-serving institutions.

TABLE 11. Baseline and Post-Intervention (PI) Mean Scores, Standard Deviations, and Mean Changes for IRCBIM Domains as Reported by Faculty, Administrators/Staff, and Students

Domain	Variable	Baseline (n = 61) M	SD	PI (n = 64) M	SD	Mean Change
Research Infrastructure	My institution needs a strategic plan that guides and promotes research capacity building and infrastructure development for faculty, staff, and students.	4.16	1.214	1.72	.881	-2.44
	My institution's sponsored programs office needs technical assistance to be more effective.	3.80	1.307	1.58	.793	-2.22
	My institution's Institutional Review Board (IRB) system needs technical assistance to be more effective.	3.78	1.279	1.69	.906	-2.09
	My institution's technological resources such as computers and research software (e.g., SPSS, SAS, and NVivo) are adequate.	2.71	1.173	1.78	.934	-0.93
Research Design Training	How important is the need for Quantitative Research Design training at your institution?	1.86	.764	1.72	.881	-0.14
	How important is the need for Qualitative Research Design training at your institution?	1.90	.797	1.69	.906	-0.21
	How important is the need for Qualitative Data analysis using NVivo training at your institution?	2.39	1.057	1.58	.793	-0.81
	How important is the need for Quantitative Data analysis using IBM SPSS Statistics (formerly SPSS Statistics) training at your institution?	1.94	1.008	1.78	.934	-0.16
Manuscript Development Training	How important is the need for conducting effective Literature Reviews training at your institution?	2.37	1.167	1.80	.979	-0.57
	How important is the need for students-faculty research collaboration training at your institution?	1.57	.842	1.64	.897	0.07
	How important is the need for Manuscript development and peer review publication process training at your institution?	2.06	1.049	1.63	.917	-0.43
Grant Writing Training	How important is the need for Grant writing and management training at your institution?	1.57	.816	1.41	.729	-0.16
	How important is the need to have a training on how to develop a working relationship with Federal grant Funding agencies (e.g. NIDILRR and NIH) at your institution?	1.61	.731	1.41	.729	-0.20
	How important is the need for understanding ''behind-the-scenes'' decisions that determine proposal acceptance and denial training at your institution?	1.53	.767	1.52	.873	-0.01
Research Leadership Training	How important is the need for collaborative research and effective research teams training at your institution?	1.88	1.092	1.53	.776	-0.35
	How important is the need for Time management (i.e., balancing teaching, research, service, and personal commitments) training at your institution?	1.96	1.117	1.56	.889	-0.40

Faculty Scholars' Perspectives

In our effort to better understand the sole perspectives of faculty members, we broke out their perspective results from those of administrators/staff and students. Figure 3 shows notable increases of research capacity building and infrastructure development by domain (e.g., collaboration, research funds, access to resources, mentorship, research networks, skills and knowledge, confidence to conduct research, confidence, collegiality, and work-life balance) per faculty scholars' responses. Table 12 displays the baseline and post-intervention mean change results for items under each domain. An increase in the mean ratings between baseline and post-intervention signified an increase in that particular domain variable. Faculty members perceived positive change to have occurred across most of the domains. Respondents reported the greatest change in research funds, research networks, collaboration, research culture, self-confidence, and work-life balance. Domains that appeared to have experienced the least change include collegiality, incentives, and commitment to the field of disability. The increases were generally modest and reflects the fact that building research capacity and improving research infrastructures at minority-serving institutions takes time and sustained effort.

Incentives. In this study, the evaluation of incentives focused on faculty members' perspectives regarding the congruence between the monetary reward system at their institutions and personal and/or institution's research vision and goals. Additionally, the research team sought to understand their perceptions of the mechanisms for recognizing and celebrating faculty members' research achievements at their institution. Surprisingly, respondents reported no overall change between baseline (M = 2.85) and post-intervention (M = 2.85) regarding incentives to conduct research. However, an examination of the two individual items showed that there was a slight positive change in the way they perceived the monetary reward system at their institution (M = 2.53 and M = 2.59, respectively).

Research culture. The evaluation indicated that respondents perceived the research culture (i.e., the value placed on participating in the scientific knowledge creation and disseminating scientific research at the institutional and unit levels) to have improved between baseline (M = 2.56) and post-intervention (M = 3.07). Indicators that were used to evaluate research culture included faculty scholars' perceptions about the portion of the academic department's faculty considered to be productive in research and whether their departmental heads were highly regarded based on their research accomplishments. The greatest change between the two measurements occurred for the following item: a large portion of my academic department's faculty can be considered to be productive in research (M = 2.58 and M = 3.27).

Investment. This domain focused on evaluating and understanding the perspectives of faculty scholars regarding institutional expenditures on areas that are responsible for supporting cutting-edge research and innovation. Overall, respondents reported improved investments between baseline (M = 2.97) and post-intervention (M = 3.02). Specific evaluative areas included the availability of a clear institutional strategic plan that promoted research capacity building and infrastructure development, databases of both successful and unsuccessful applications for funding, and allocation of adequate

resources (e.g., research seed and start-up funds) for professional development in disability and rehabilitation research. The greatest change occurred in how respondents perceived their institution to regularly offer trainings on research methods and/or grant writing skills development at baseline and post-intervention (M = 2.89; M = 3.16, respectively). The least change occurred in how respondents perceived their institution to have a clear strategic plan that promotes research capacity building and infrastructure development at baseline and post-intervention (M = 3.00 and M = 3.05, respectively).

Research governance structures. Overall, respondent's perspectives about their research governance structures slightly decreased between baseline (M = 3.30) and post-intervention (M = 3.24). However, an examination of individual items within this domain revealed mixed findings. For example, respondents' responses indicated a positive change in research financial research systems between baseline (M = 2.89) and post-intervention (M = 3.12). Similarly, they evaluated the effectiveness of their information technology management and support system more favorably at post-intervention (M = 3.24) compared to baseline (M = 3.11).

Human resources. The evaluation of human resources focused on aspects such as qualifications of personnel and adequacy of research support staff (e.g., secretarial support and research assistants). Results showed a notable positive change, which indicated overall increased capacity in human resources between baseline (M = 2.54) and post-intervention (M = 2.74). However, respondents felt that the number of qualified personnel had decreased between baseline (M = 3.58) and post-intervention (M = 3.39).

Collaboration. The evaluation of collaboration focused on research partnerships with institutions within and outside the U.S. and the availability of a protocol for conducting international research. Overall, results indicated that collaboration at the institutional level had been strengthened between baseline (M = 2.28) and post-intervention (M = 2.82). The greatest change occurred for how well respondents perceived their institution to have developed research partnerships with institutions outside the U.S (M = 1.95; M = 2.58, at baseline and post-intervention, respectfully). The least change occurred for how well respondents perceived their institutions to have developed research partnerships with other U.S institutions (M = 2.63; M = 3.03, at baseline and post-intervention, respectfully).

Research funds. The overall mean score of the research funds domain changed as well (M = 2.22; M = 2.77, at baseline and post-intervention, respectfully). Based on faculty scholars' perspectives, the evaluation sought to understand the flow of federal research funding (e.g., NIDILRR and NIH) to institutions, the availability of federal research capacity building, Fellowships to faculty members, and the sufficiency of publications of minority-serving institution research capacity building funding opportunity announcements (FOAs} and associated priorities. The evaluation indicated that the greatest change score difference yielded appears to have occurred in how respondents perceived the sufficiency of request for proposals published targeting minority-serving institution (M = 1.94; M = 2.76, at baseline and post-intervention, respectively). Conversely, the least change score difference yielded appears

to have occurred in how respondents perceived their institution to regularly receive federal research funding (M = 2.67; M = 3.06, at baseline and post-intervention, respectively).

External participation. External participation (i.e., opportunities to participate in federal funding processes) among faculty members appeared to have improved. Overall, the mean score in the external participation domain changed between baseline (M = 1.87) and post-intervention (M = 2.13). The greatest change occurred in how respondents perceived faculty members from their institution to regularly have opportunities to serve on federal research entity (e.g., NIDILRR and NIH) advisory committees or related bodies (M = 2.33; M = 2.79, at baseline and post-intervention, respectively). The least change occurred in respondents' perceptions regarding opportunities to serve regularly as a federal grant proposal review panelist (M = 1.56; M = 1.58, at baseline and post-intervention, respectively).

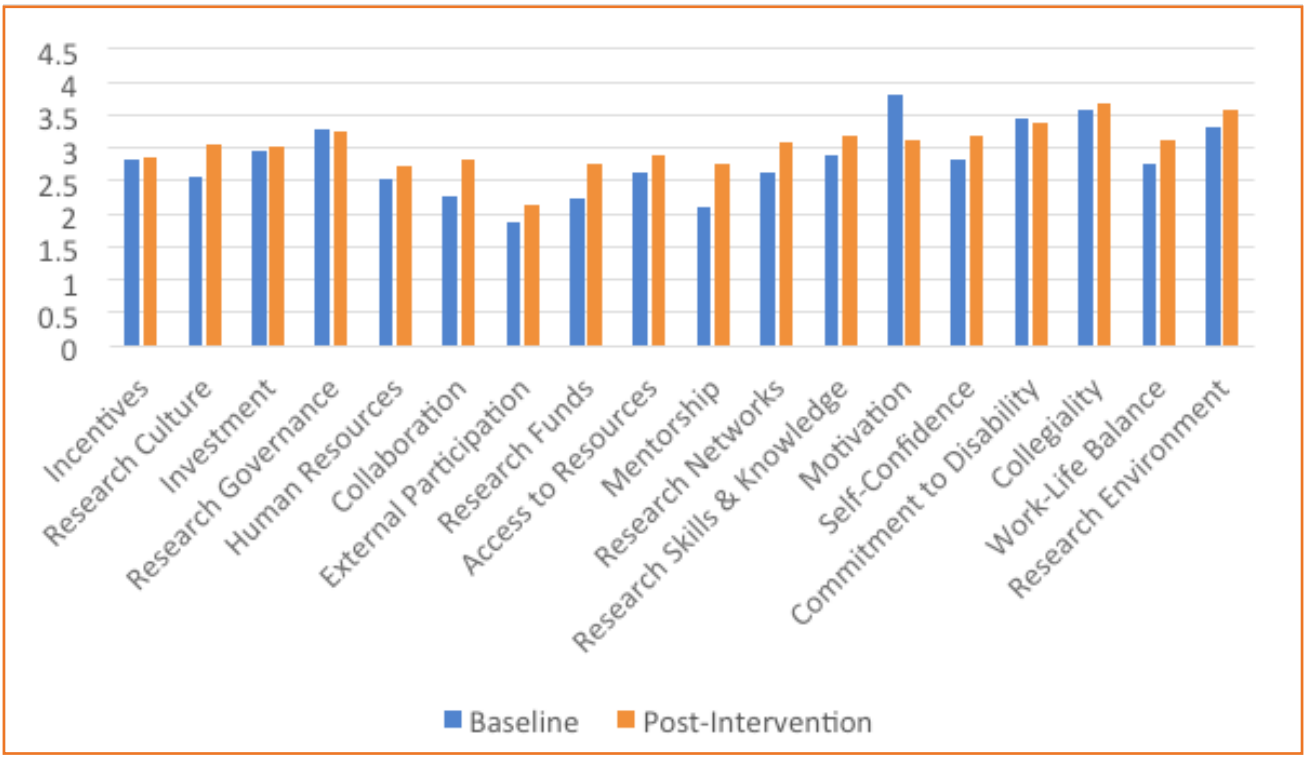
Access to resources. Access to resources, a key element of research capacity building improved, overall, between baseline (M = 2.63) and post-intervention (M = 2.90). The greatest change occurred in how well respondents perceived their institution to regularly receive private research funding to conduct disability research (M = 2.17; M = 2.97, at baseline and post-intervention, respectively). The least change occurred in respondent's perception about having adequate access to technological resources (e.g., computers and research software) to conduct research projects (M = 2.72; M = 2.61, at baseline and post-intervention, respectively).

Mentorship. Overall, respondents' perspectives regarding the availability and/or access to mentorship opportunities also changed between baseline (M = 2.09) and post-intervention (M = 2.75). The analysis of individual items, for example, revealed that more faculty members were to report the availability of formal research mentoring programs for faculty within their department at post-intervention (M = 2.30) when compared to baseline (M = 1.61).

Research networks. Overall, faculty members reported an increase in research networks between baseline (M = 2.63) and post-intervention (M = 3.10). The greatest change appears to have occurred in the way faculty members self-evaluated their interdisciplinary research networks (M = 2.06; M = 2.81, at baseline and post-intervention, respectively). Respondents reported change occurred least in the way they perceived the availability of opportunities to serve as peer reviewers for academic journals from baseline (M = 2.61) to post-intervention (M = 2.69).

Research skills and knowledge. The analysis indicated that faculty scholars' research skills and knowledge increased between baseline *(*M = 2.89) and post-intervention *(*M = 3.20). The greatest change occurred in the faculty scholars' perception regarding the adequacy of support received from their academic department to travel to research-based conferences (M = 2.61; M = 3.03, at baseline and post-intervention, respectively). The least change occurred in faculty members confidence in their ability to effectively manage a grant (M = 3.06; M = 3.16, at baseline and post-intervention, respectively).

FIGURE 3.
Overall Baseline and Post-Intervention Mean Scores for Specific IRCBIM Domains as Reported by Faculty Scholars



Motivation. Results indicated that the motivation of the faculty scholars that participated in the study changed ($M = 3.81$; $M = 3.13$, at baseline and post-intervention, respectfully), indicating decreased motivation to conduct research. The items under the motivation domain focused on whether participants perceived themselves as being internally or externally driven to conduct disability and rehabilitation research.

Self-confidence. Generally, respondents reported enhanced confidence to conduct disability and health research between baseline ($M = 2.83$) and post-intervention ($M = 3.19$). For example, respondents reported increased research publications between baseline (M = 2.72) and post-intervention (M = 3.34).

Commitment to the disability field. There was a slight decrease in the overall mean scores for respondents reporting a negative change on the commitment to the field of disability ($M = 3.45$; $M = 3.39$, at baseline and post-intervention, respectively). However, an examination of individual items showed that participants had a better plan for achieving academic goals at post-intervention ($M = 4.00$) when compared to baseline ($M = 3.67$). Additionally, participants were more likely to perceive themselves as disability and rehabilitation researchers at post-intervention ($M = 3.25$) than at baseline ($M = 3.11$).

Collegiality. Overall, the collegiality domain changed positively between baseline ($M = 3.58$) and post-intervention ($M = 3.69$). In this research capacity building domain, we evaluated aspects such as faculty members' perspectives regarding the support they received from departmental heads about

their research efforts and the quality of feedback, guidance, and suggestions they received from their colleagues. The greatest change occurred in faculty members' perspectives about their department colleagues being open to collaborating on research opportunities ($M = 3.17$; $M = 3.66$, at baseline and post-intervention, respectfully). Conversely, the least change occurred in the quality of feedback, guidance, and suggestions respondents received from their colleagues ($M = 3.50$; $M = 3.63$, at baseline and post-intervention, respectfully).

Work-life balance. Overall, results indicated work-life balance positively changed between baseline ($M = 2.78$) and post-intervention ($M = 3.13$). Upon examination of specific items, the greatest change occurred in the evaluation of whether faculty members felt overwhelmed by research requirements at their respective institutions ($M = 1.83$; $M = 2.44$, at baseline and post-intervention, respectfully). Least change occurred in faculty members perspectives regarding their capacity to manage existing competing factors to conducting research ($M = 3.28$; $M = 3.47$, at baseline and post-intervention, respectfully).

Research environment. Improved institutional environment encourages research, which is beneficial for both the institution and individual faculty scholars. Conversely, an environment that does not promote research not only acts as a barrier but also stymies the research enterprise pipeline. Overall, quantitative evaluation results indicated that research environment improved between baseline ($M = 3.33$) and post-intervention ($M = 3.59$). The greatest change score difference appears to have occurred in the way faculty members self-evaluated feelings of appreciation and being valued for their research with colleagues within their institution ($M = 3.22$; $M = 3.69$, at baseline and post-intervention, respectively). Change occurred least in faculty scholars perception of having adequate space to conduct research ($M = 3.44$; $M = 3.56$, at baseline and post-intervention, respectively).

TABLE 12. Baseline and Post-Intervention (PI) Mean Scores, Standard Deviations, and Mean Change for Each IRCBIM Domains as Reported by Faculty

Domain	Variable	Baseline ($n = 34$)		PI ($n = 39$)		Mean Change
		M	SD	*M*	SD	
Incentives	The monetary reward system at your institution matches your personal and/or institution's research vision and goals.	2.53	.841	2.59	.985	0.06
	My institution has systematic and fair mechanisms for recognizing and celebrating faculty members' research achievements.	3.16	1.344	3.11	1.149	-0.05
Research Culture	A large portion of my academic department's faculty can be considered to be productive in research (e.g., publish peer-reviewed articles, and secure research grants).	2.58	1.071	3.27	1.283	0.69
	My department head is highly regarded for his/her research.	2.53	1.429	2.86	1.228	0.33

Investment	My institution has a clear strategic plan that promotes research capacity building and infrastructure development.	3.00	1.155	3.05	1.104	0.05
	My institution maintains databases of both successful and unsuccessful applications for funding, along with information that could help future applications to specific funders.	3.42	1.071	3.30	1.244	-0.12
	My institution allocates adequate resources (e.g., research seed and start-up funds) for professional development in disability and rehabilitation research.	2.58	1.539	2.57	1.119	-0.01
	My institution regularly offers trainings on research methods and/or grant writing skills development.	2.89	1.560	3.16	1.014	0.27
Research Governance Structures	I consider my sponsored programs office effective in supporting research and grant management needs.	3.63	1.257	3.33	1.051	-0.30
	I consider my institution's research financial management system as effective in achieving research and grant management needs.	2.89	1.286	3.12	.927	0.23
	I consider my institution's information technology (IT) management and support system as effective in supporting research and grant management needs.	3.11	1.150	3.24	1.091	0.13
	I consider my institution's Institutional Review Board (IRB) system as effective in supporting research and grant management needs.	3.58	1.121	3.27	1.039	-0.31
Human Resources	My institution's research support office (sponsored programs) consists of qualified personnel who provide adequate support to faculty researchers.	3.58	1.305	3.39	1.116	-0.19
	Faculty scholars at my institution have adequate research support staff (e.g., secretarial support and research assistants).	2.26	1.368	2.48	1.228	0.22
	My teaching, advising, and service commitments allow me ample time to conduct research.	1.79	.976	2.36	1.168	0.57
Collaboration	My institution has well developed research partnerships with other U.S institutions.	2.63	1.165	3.03	.984	0.40
	My institution has well developed research partnerships with institutions outside the U.S.	1.95	1.268	2.58	1.226	0.63
	My institution has a protocol for conducting international research.	2.26	1.628	2.85	1.372	0.59
Research Funds	My institution regularly receives federal research funding (e.g., NIDILRR and NIH).	2.67	1.188	3.06	.864	0.39
	Federal Research capacity building Fellowships are usually available to faculty members at my institution.	2.06	.873	2.48	.795	0.42
	Federal disability research entities publication of minority entity research capacity building (RCB) request for proposals (RFPs) and associated priorities are sufficient.	1.94	.998	2.76	1.032	0.82
External Participation	I regularly serve as a federal grant proposal review panelist.	1.56	1.097	1.58	.933	0.02
	I have sufficient opportunities to lead federally funded disability and rehabilitation research projects.	1.72	1.018	2.03	.992	0.31
	Faculty members from my institution usually have opportunities to serve on federal research entity (e.g., NIDILRR and NIH) advisory committees or related bodies.	2.33	1.138	2.79	1.132	0.46

Access to Resources	I have adequate access to technological resources such as computers and research software (e.g., SPSS, SAS, and NVivo) to conduct my research projects.	2.72	1.320	2.61	.933	-0.11
	Overall, the Informational Technology (IT) department is responsive to my research technological support needs.	3.00	1.283	3.12	.992	0.12
	My institution regularly receives private research funding (e.g., from businesses and non-governmental organizations such as Robert Wood Johnson Foundation and Bill & Melinda Gates Foundation) to conduct disability research.	2.17	.924	2.97	1.132	0.80
Mentorship	My institution provides adequate research training opportunities (e.g., training to use research software).	2.11	1.132	2.73	1.069	0.62
	My institution has a faculty development support scheme to facilitate faculty participation in conferences.	2.56	1.504	3.21	1.053	0.65
	My institution has a formal research mentoring program for faculty in my department.	1.61	.979	2.30	1.334	0.69
Research Networks	I have a well-developed interdisciplinary research network, particularly in areas related to disability and rehabilitation.	2.06	1.162	2.81	1.330	0.75
	I have a well-developed network of colleagues in the department with whom one can discuss disability and rehabilitation research projects.	2.89	1.231	3.31	1.281	0.42
	I regularly serve as a peer reviewer for academic journals.	2.61	1.819	2.69	1.424	0.08
	I make research presentations (including poster presentations) at research conferences at least once a year.	2.94	1.765	3.59	1.604	0.65
Research Skills & Knowledge	I believe I am currently ‘’up-to-date” in Research skills in my area (e.g., statistics, research design, data collection and analysis using statistical software, and data management).	2.61	1.290	3.00	1.047	0.39
	I believe I am currently ‘’up-to-date” in Writing skills (e.g., identifying appropriate outlet/audience, constructing concise/persuasive text.	3.39	.608	3.59	.979	0.20
	I am confident in my ability to effectively manage a grant (e.g., budget, building internal relationships, executing grant activities).	3.06	1.474	3.16	1.221	0.10
	I believe I am currently ‘’up-to-date” in research grant-procurement skills in my area (e.g., interpreting request for proposals, identifying funding sources, preparing grants, using research reviews).	2.33	1.085	2.72	1.224	0.39
	I stay very ‘’up-to-date” on the current literature in my research interest area(s).	3.33	1.237	3.69	.896	0.36
	My academic department provides me with adequate support to travel to research-based conferences.	2.61	1.243	3.03	1.307	0.42
Motivation	I would describe myself as being internally driven to conduct disability and rehabilitation research.	4.22	1.003	3.31	1.330	-0.91
	I would describe myself as being externally driven to conduct rehabilitation research.	3.39	1.195	2.94	1.366	-0.45
Self-Confidence	I have authored or co-authored research publications in the past 2 years.	2.72	1.742	3.34	1.789	0.62
	I have excellent opportunities to pursue my interests in disability and rehabilitation research at my institution.	2.94	1.349	3.03	1.257	0.09

Commitment to the Disability Field	I have a well-defined plan for achieving my academic career goals.	3.67	.840	4.00	.880	0.33
	I see myself as a disability and rehabilitation researcher.	3.11	1.278	3.25	1.270	0.14
	My career goal is to become a highly regarded disability and rehabilitation researcher.	3.56	1.381	2.91	1.279	-0.65
Collegiality	My department head is very supportive of my efforts in research.	4.06	.998	3.78	1.157	-0.28
	I get constructive feedback, guidance and suggestions from my department colleagues that help me perform my best.	3.50	.857	3.63	1.238	0.13
	Colleagues in my department are open to collaborating on research opportunities.	3.17	.857	3.66	1.405	0.49
Work-Life Balance	I feel overwhelmed by research requirements at my institution.	1.83	.985	2.44	1.105	0.61
	I am good at managing research related stress.	3.22	1.215	3.47	.983	0.25
	I am able to manage existing competing factors (e.g., family, friends, and time) to conducting research.	3.28	1.018	3.47	.983	0.19
Research Environment	I have adequate space to conduct my research.	3.44	1.149	3.56	.982	0.12
	The skills, expertise, and experience of faculty in my department are appropriate to accomplish our research goals.	3.33	1.237	3.53	.983	0.20
	I feel appreciated and valued by my local colleagues (departments/school/university) for my work in research.	3.22	1.309	3.69	1.176	0.47

Findings Based on Fellows' Survey Responses

Academy Fellows participated in the IRCBIM peer-to-peer mentorship component.

To give a more accurate representation of the Academy evaluation outcomes, we also separately analyzed Fellow's responses to online survey questions. Remarkably, an increase in mean results between baseline and post-intervention indicated an enhancement across domain values. Overall, Fellows reported greatest change in the following domains: research environment ($M = 3.33$; $M = 3.63$, at baseline and post-intervention, respectfully), self-confidence ($M = 2.83$; $M = 3.60$, at baseline and post-intervention, respectfully), research funds (baseline [$M = 2.22$, post-intervention [$M = 2.79$]), collaboration ($M = 2.48$; $M = 2.97$, at baseline and post-intervention, respectfully), and mentorship (baseline [$M = 2.09$], post-intervention [$M = 2.57$]). Other domains that showed overall positive change include commitment to the disability field (baseline [$M = 3.45$], post-intervention [$M = 3.83$]), research networks (baseline [$M = 2.39$], post-intervention [$M = 2.82$]), human resources (baseline [$M = 2.44$], post-intervention [$M = 2.79$]), work-life balance (baseline [$M = 2.78$; post-intervention [$M = 3.10$]), research culture (baseline [$M = 2.47$; post-intervention [$M = 2.54$], motivation (baseline [$M = 3.80$], post-intervention [$M = 4.10$]), skills and knowledge (baseline [$M = 2.89$, post-intervention [$M = 3.12$]), and external participation (baseline [$M = 1.87$], post-intervention [$M = 1.97$]). Domains that appear to have experienced least change include access to resources (baseline [$M = 2.63$], post-intervention [$M = 2.73$]) and incentives (baseline [$M = 2.78$], post-intervention [$M = 2.88$]).

Surprisingly, the collegiality domain (baseline [$M = 3.57$], post-intervention [$M = 3.50$]) is the only area that appeared to experience negative change. However, when you examine individual items

within this domain, there appear to be mixed findings. For example, results indicated a positive change regarding Fellows receiving feedback from their colleagues. The results indicated that faculty members at the department level were more open to collaborating on research at post-intervention when compared to the pre-intervention. Surprisingly, Fellows felt that they received less support from departmental heads at post-intervention when compared to pre-intervention. Table 13 displays raw mean and standard deviations for each research capacity building and research infrastructure domain as reported by Fellows (i.e., faculty scholars who participated in the mentorship academy).

TABLE 13. Baseline and Post-Intervention (PI), Mean Scores, Standard Deviations, and Mean Change for Each Research Capacity Building Variable as Reported by Fellows

Domain	Variable	Baseline (n = 14) M	SD	PI (n = 18) M	SD	Mean Change
Collaboration	My institution has well developed research partnerships with other USA institutions.	2.50	1.043	3.18	1.168	0.68
	My institution has well developed research partnerships with institutions outside the USA.	2.83	1.200	2.73	1.489	-0.10
	My institution has a protocol for conducting international research.	2.11	1.530	3.00	1.612	0.89
Research Funds	My institution regularly receives federal research funding (e.g., NIDILRR and NIH).	2.67	1.188	3.00	.775	0.33
	Federal Research capacity building Fellowships are usually available to faculty members at my institution.	2.06	.809	2.64	.809	0.58
	Federal disability research entities publication of minority entity research capacity building (RCB) request for proposals (RFPs) and associated priorities are sufficient.	1.94	.998	2.73	.905	0.79
External Participation	I regularly serve as a federal grant proposal review panelist.	1.56	1.097	1.73	1.009	0.17
	I have sufficient opportunities to lead federally funded disability and rehabilitation research projects.	1.72	1.018	1.73	.905	0.01
	Faculty members from my institution usually have opportunities to serve on federal research entities (e.g., NIDILRR and NIH) advisory committees or related bodies.	2.33	1.138	2.45	.934	0.12
Access to Resources	I have adequate access to technological resources such as computers and research software (e.g., SPSS, SAS, and NVivo) to conduct my research projects.	2.72	1.320	2.91	.701	0.19
	Overall, the Informational Technology (IT) department is responsive to my research technological support needs.	3.00	1.283	2.82	.874	-0.18
	My institution regularly receives private research funding (e.g., from businesses and non-governmental organizations such as Robert Wood Johnson Foundation and Bill & Melinda Gates Foundation) to conduct disability research.	2.17	.924	2.45	.934	0.28

Mentorship	My institution provides adequate research training opportunities (e.g., training to use research software).	2.11	1.132	2.45	.820	0.34
	My institution has a faculty development support scheme to facilitate faculty participation in conferences.	2.56	1.504	3.36	1.027	0.80
	My institution has a formal research mentoring program for faculty in my department.	1.61	.979	1.91	.944	0.30
Research Networks	I have a well-developed interdisciplinary research network, particularly in areas related to disability and rehabilitation.	2.06	1.162	3.00	1.155	0.94
	I have a well-developed network of colleagues in the department with whom one can discuss disability and rehabilitation research projects.	2.89	1.231	3.10	1.197	0.21
	I regularly serve as a peer reviewer for academic journals.	2.61	1.819	2.80	1.476	0.19
	I make research presentations (including poster presentations) at research conferences at least once a year.	2.94	1.765	3.70	1.636	0.76
	Developing research networks and partnerships.	1.44	.705	1.50	.527	0.06
Skill and Knowledge	I believe I am currently ‘’up-to-date” in Research skills in my area (e.g., statistics, research design, data collection and analysis using statistical software, and data management).	2.61	1.290	2.60	.843	-0.01
	I believe I am currently ‘’up-to-date” in Writing skills (e.g., identifying appropriate outlet/ audience, and constructing concise/persuasive text).	3.39	.608	3.40	1.075	0.01
	I am confident in my ability to effectively manage a grant (e.g., budget, building internal relationships, and executing grant activities).	3.06	1.474	3.50	1.080	0.44
	I believe I am currently ‘’up-to-date” in research grant-procurement skills in my area (e.g., interpreting request for proposals, identifying funding sources, preparing grants, and using research reviews).	2.33	1.085	2.60	.843	0.27
	I stay very ‘’up-to-date” on the current literature in my research interest area(s).	3.33	1.237	3.60	1.075	0.27
	My academic department provides me with adequate support to travel to research-based conferences.	2.61	1.243	3.00	1.333	0.39
Motivation	I would describe myself as being internally driven to conduct disability and rehabilitation research.	4.22	1.003	4.10	.738	-0.12
	I would describe myself as being externally driven to conduct rehabilitation research.	3.39	1.195	4.10	.738	0.71
Self-Confidence	I have authored or co-authored research publications in the past 2 years.	2.72	1.742	4.20	1.229	1.48
	I have excellent opportunities to pursue my interests in disability and rehabilitation research at my institution.	2.94	1.349	3.00	1.155	0.06

Commitment to the disability field	I have a well-defined plan for achieving my academic career goals.	3.67	.840	4.10	.994	0.43
	I see myself as a disability and rehabilitation researcher.	3.11	1.278	3.80	.789	0.69
	My career goal is to become a highly regarded disability and rehabilitation researcher.	3.56	1.381	3.60	.966	0.04
Collegiality	My department head is very supportive of my efforts in research.	4.06	.998	3.80	.789	-0.26
	I get constructive feedback, guidance and suggestions from my department colleagues that help me perform my best.	3.50	.857	3.50	1.354	0.00
	Colleagues in my department are open to collaborating on research opportunities.	3.17	.857	3.20	1.619	0.03
Work-Life Balance	I feel overwhelmed by research requirements at my institution.	1.83	.985	2.10	.738	0.27
	I am good at managing research related stress.	3.22	1.215	3.70	.949	0.48
	I am able to manage existing competing factors (e.g., family, friends, and time) to conducting research.	3.28	1.018	3.50	.972	0.22
Research Environment	I have adequate space to conduct my research.	3.44	1.149	3.60	.843	0.16
	The skills, expertise, and experience of faculty in my department are appropriate to accomplish our research goals.	3.33	1.237	3.60	.843	0.27
	I feel appreciated and valued by my local colleagues (departments/school/university) for my work in research.	3.22	1.309	3.70	1.252	0.48
Incentives	The monetary reward system at your institution matches your personal and/or institution's research vision and goals.	2.50	.857	2.92	.900	0.42
	My institution has systematic and fair mechanisms for recognizing and celebrating faculty members' research achievements.	3.06	1.305	2.83	1.267	-0.23
Research Culture	A large portion of my academic department's faculty can be considered productive in research (e.g., publish peer-reviewed articles, and secure research grants).	2.50	1.043	2.83	1.193	0.33
	My department head is highly regarded for his/her research.	2.44	1.423	2.25	1.288	-0.19
Human Resources	My institution's research support office (sponsored programs) consists of qualified personnel who provide adequate support to faculty researchers.	3.50	1.295	3.45	1.036	-0.05
	Faculty scholars at my institution have adequate research support staff (e.g., secretarial support, and research assistants).	2.11	1.231	2.55	1.293	0.44
	My teaching, advising, and service commitments allow me ample time to conduct research.	1.72	.958	2.36	1.027	0.64

Qualitative Findings

This section presents qualitative findings. The findings reflect the analysis of data collected through face-to-face interviews, focus group discussions, document reviews, and observations. Within this section, the term "participants" refers generally to key interview informants and focus group participants. As shown in Table 14, data were organized and coded according to major categories

based on IRCBIM customized intervention components (i.e., peer-to-peer mentoring, communities of practice, grant writing training, technical assistance and consultation on infrastructure issues, providing research support resources, and technological support consultation). The challenges category addresses overall issues deemed to impede the implementation of IRCBIM, followed by strategies for overcoming identified challenges.

TABLE 14. Major Categories and Themes Related to IRCBIM

Category	Themes
Peer-to-peer mentoring	Skills and knowledge Advance institutional mission Research productivity Research leadership Professional development, tenure, and promotion Inter-professional learning Success in graduate school Collaboration and networking Confidence and motivation Research culture and development Capable mentors Empowering minority-serving institutions
Community of practice	Cross-fertilization of knowledge Platform for problem solving Networking and support system Validation of research generated at minority-serving institutions Institutional development
Grant writing and manuscript development training	Grant writing skills and knowledge Enhanced scholarship Awareness of federal funding opportunities Manuscript development and publication skills and knowledge Empowerment of researchers Confidence building
Research infrastructure improvement strategic planning	Strategic planning Creating a vital pipeline to diversify the scientific workforce Developing a culture of research Improving student learning outcomes Institutional prestige and advancement
Research support resources	Incentives
Overall RCB challenges	Multidisciplinary challenges Coordinating schedules Different research capabilities Limited mentorship opportunities Distance learning challenges Cultural competency Inadequate time Matching mentors with Fellows Institutional problems Lack of awareness Lack of clear strategy Lack of funding Infrastructure challenges Lack of interest Lack of participation Lack of resources Leadership turnover Scheduling conflicts Heavy teaching loads Lack of incentives

Category 1: PEER-TO-PEER MENTORING

Existing research indicates that developing excellent researchers and achieving research excellence primarily depends on the availability of mentors (Beech et al., 2013; Colon-Emeric et al., 2012; Manyibe et al., 2015; Moore et al., 2012), who help socialize faculty and students into the research arena. Research mentorship is especially crucial for the scientific development and personal growth of minority-serving institution affiliated faculty scholars and students (Manyibe et al., 2015). Our findings, based up the IRCBIM field-test across the five minority-serving institutions, illustrate the essential role that formal research mentoring plays. Below we discuss themes that described the advantages of the Academy, one of the seven components of IRCBIM.

Advance institutional mission. Participants described the mentoring intervention component of the model as contributing to advancing the mission and direction of participating institutions. Participants stated that, like other institutions of higher learning, the mission of minority-serving institutions encompasses teaching, research, and service. One participant noted, mentoring was helping generate "faculty that really do follow the mission and the philosophy of the institution, that really do support what we intend for our population, which is very diverse and minority-serving."

A review of documents indicated that these institutions aim to prepare the next generation of leaders ready to provide contextualized and innovative solutions to complex local and global challenges in numerous fields such as disability, rehabilitation, health, and engineering. One participant noted, "It [Peer-to-Peer Research Team Mentorship Academy] is great because we are planning to be a Tier I Research Institution; used to be a teaching institution." One Fellow observed:

> Well, it advanced my research. We got publications out of it, so the University benefits from that. A few presentations, again, the University benefitted from that, and then we submitted, I believe, three grant submissions, so the University definitely benefited from just the ongoing attempts to try to secure funding.

Faculty mentoring contributes to student learning and retention. Participants noted that mentoring plays a significant role in developing an overall climate that "supports teaching and research" and "offers students more opportunities to enhance their skills in research, critical thinking, problem-solving, communication, planning media literacy, and goal setting." One student, for example, noted that one of the biggest advantages of the mentoring "would be different perspectives brought in about different ways of teaching, maybe different teaching methods that specific teachers are using, which makes it better for students." Similarly, a review of documents revealed that the IRCBIM would enhance students' learning experiences and, as one document revealed:

> It [Peer-to-Peer Mentoring] is helping, or it will help to grow the faculty and their capacity to build on what they're trying to do for the students, to help broaden and expand overall what it [institution] is trying to do for the students, to educate them and help them to move forward in their educational processes.

Research leadership. Academy Fellows generally agreed that mentorship helped them to develop leadership skills such as relationship building, negotiation, problem solving, initiation, cultural

sensitivity, and communication. They noted that the leadership skills they gained would help them lead research teams, develop collaborations, and establish networks. Leadership opportunities involved having the ability to bring together shared or different experiences as well as diverse worldviews. One administrator noted:

> I just think that the mentoring program was an excellent model of really transforming them and bringing them to research as researchers.

Another administrator explained that individuals who could "harness the group's collective, unique skills, knowledge, and abilities toward the common goal" were positioned to become effective leaders. The administrator further noted:

> So bringing that diverse group together can certainly help shorten the learning curve for each individual and enrich their experience in that process as well.

The ability to manage grants was viewed as a leadership-building opportunity. Maintaining "up-to-date" knowledge in grant management requires skilled research leaders. Principal Investigators, for instance, are required to understand and execute their scientific and administrative responsibilities in a rapidly changing accountability system. Initially, several participants, especially faculty scholars, indicated that they were not aware of grant management practices. For example, their unawareness included the responsibilities of the Principal Investigator, funding mechanisms, federal cost principles, data sharing regulations, operations of institutional internal systems, pre/post-award management, and subcontracting with outside collaborators. One administrator observed:

> So, teaching all those different layers and having it be impactful and meaningful is, I think, what would be a benefit to the trainings that were offered. And, again, not a cookie-cutter. This is what their needs are over here, and these are the agencies that they kind of look to fund these needs. And these are the requirements, and this is how you become successful at the requirements.

Capable mentors. All Academy Fellows greatly appreciated the vital role mentors played in making their mentorship experience successful. The Fellows reported that it is very difficult to find mentors who have obtained and managed research grants from federal agencies. They singled out the experience, knowledge and skills, the willingness to share resources with them, the support they received, and the style of leadership as some of the qualities they greatly appreciated about their mentors. One Fellow observed:

> She [mentor] has been very instrumental, especially with the grants that we've submitted thus far, providing feedback in a timely manner." Also, one Fellow commented that their mentors made "sure we had what we needed to get the job done."

Participants felt that the intersectionality of early career and seasoned researchers are critical in developing research leaders. Many Fellows, for instance, felt that their mentors modeled good leadership strategies for them. For example, one Fellow noted, "We drive the meetings versus her [mentor] telling us what to do." Mentors exemplified their leadership skills by genuinely demonstrating that they wanted the Fellows to succeed. One Fellow captured this essential attribute:

> And what's great about them [mentors] is they all want to see you succeed. They all want to help

with every single thing. And it's not--you don't feel like any question is dumb, or they're really there to walk you through the process.

Recognizing that the peer-to-peer mentoring promotes symbiotic relationships, several mentors perceived their role as that of preparing the next generation of successful research leaders while at the same time learning from the Fellows. Reflecting on their experience one mentor noted, "And I don't think I've done a good job as a mentor unless I am helping to mentor people who will far exceed anything I've been able to do in my career."

Mentors acknowledged that their seasoned research experience provided them an opportunity to be intentional in how they wanted to influence the Fellows. Mentors identified role modeling as one of the strategies they employed to help Fellows develop their leadership skills.

I actually feel like it's a learning experience for them on multiple levels that we are modeling for them how to be collegial and generous with whatever skills you have to bring to the table, and we all come with different ones.

Also, mentors saw their role as that of empowering Fellows with skills and knowledge to function competently within systems that directly or indirectly influence the research team science. For example, one mentor noted, "we're building capacities of the people within systems to be able to work together to do big-picture things." Table 15 shows a summary of Fellow expectations and mentors' roles.

TABLE 15. Fellows Expectations and Mentors Role

Project	Fellows Role/Expectations	Research Mentor Role/Responsibilities
Develop Research Project	Identify Problem	Guide conceptualization
	Develop research question(s) Develop literature review Formulate testable hypotheses Design methodology Data analysis selection Data collection Data analysis	Evaluate document, provide feedback, and inspire Fellows
	Manuscript development	Evaluate, provide feedback, inspire, and support Fellows
	Manuscript submission for publication	Guide, inspire, and support Fellows
Develop Research Grant Proposal	Importance of the problem (target population and need) Design of research activities (i.e., lit review, hypothesis development, sample, data collection and analysis, and plan of evaluation) Plan of evaluation Project staff Adequacy and Accessibility of resources	Guide, evaluate document, provide feedback, and inspire Fellows
	Submit proposal to NIDILRR	Guide and support

Research productivity. All Fellows, mentors, and administrators perceived the Peer-to-Peer Mentor Research Team Academy as very productive. Participants reported increased proposals submitted or funded, the number of peer-reviewed articles published or submitted for publication consideration, and several presentations made at conferences/meetings as evidence of their increased research productivity. For instance, several Fellows reported that for the first time in their careers they

were able to develop and submit a research grant proposal to NIDILRR, the flagship agency for the federal disability research agenda. One of the Fellows noted, "We [research team] submitted, I believe, three grant submissions." Writing and submitting a proposal for competitive funding consideration to NIDILRR's Minority-Serving Institution-Field Initiated Program (i.e., Catalog of Federal Domestic Assistance [CFDA] 84.133 G-4 research or CFDA 84.133 G-5 development) was one of the primary research productivity measures.

Other Fellows were very excited to have their first peer-reviewed publication or an additional publication. One Fellow observed:

> I think it [Peer-to-Peer Mentor Research Team Academy] definitely helped us get published. I mean, we've submitted three manuscripts, two have been accepted, the third one's under review.

Just like Fellows, administrators were equally pleased with the accomplishments of the Fellows, despite the numerous challenges they faced such as scheduling conflicts and scarce institutional resources. One administrator commented:

> These were … people [Fellows] that were really interested in research, but really didn't have the experience in manuscript writing, in grant writing, and really to watch them collaborate. They did presentations. …they are continuing to work on other manuscripts. So, I just think that the mentoring program was an excellent model of really transforming them and bringing them to research as researchers.

Research culture development. Participants discussed the Academy as an essential ingredient in building a culture of research excellence at their institutions. For example, participants explained that writing grants and submitting them for funding consideration, developing and submitting manuscripts to peer-reviewed journals, and participating in the community of practice were triggering positive research culture change at their institutions. One participant noted:

> I think minority-serving institutions have historically focused on teaching. I think through research, through grant writing, it moves us more toward being a research-focused institution and we're able to allow our research to impact our teaching.

Moreover, building a research culture at minority-serving institutions would ensure that these institutions play a prominent role in national efforts to diversify the scientific workforce. One participant observed:

> I am a better researcher because of my training and experience through the program. My students are going to be stronger researchers.

Inter-professional learning. The importance of inter-professional learning, as important pedagogical approach for developing research skills and advancing the academic scientific enterprise in a collaborative team environment, was underscored. There was broad agreement among participants that mentoring provided Fellows with an opportunity to share ideas, knowledge, and resources (e.g., peer-reviewed articles and data, etc.). One Fellow, for example, stated, "I think having that interdisciplinary experience is a very fruitful experience because it allows for a lot of exchange of great ideas and great theories." Another fellow explained the benefit of collective learning, "You don't feel like you are

creating something in isolation of other people so there's this level of support that exists." Mentors concurred, as one of them explained:

> They [Fellows] also learned different things like how to reach out and get partners on board, how to work within their university to get a budget done.

Interpersonal skills. Highlighting the importance of interpersonal skills, participants also identified the development of interpersonal skills as one of the advantages of participating in the Peer-to-Peer Mentor Research Team Academy. This subtheme, which involves the set of abilities enabling a person to interact positively and work successfully with others, frequently emerged in the interviews. One Fellow, for example, reported, "It [mentorship] has really built me up on how to interact with different people.''

Mentors also expressed several other benefits to themselves. For example, individual growth, developing professional relationships, the opportunity to learn disability and rehabilitation issues, increasing their knowledge about minority-serving institutions and increased self-awareness repeatedly emerged as vital benefits and outcomes of the mentorship among all participants. Mentors also indicated that the mentoring program helped them to have a better understanding of research opportunities at minority-serving institutions and challenges they faced. One mentor explained:

> And personally and professionally, it's been a great learning experience for me because just the learning about the [institutions] and also the perception about disability and rehab services … So it's been a tremendous learning experience, I think, all around.

Collaboration and networking. Most participants reported that the model, especially the mentoring component, allowed them the opportunity to collaborate and network with other researchers from different institutions. One Fellow observed:

> I was new to the college when it started. So for me, it actually let me meet two other faculty that I probably never would have met and collaborated with had I not done this.

Participants argued that the absence of research collaborations and networks limits minority-serving affiliated faculty scholars from becoming successful researchers. Fellows appeared to appreciate the opportunity to collaborate and network across disciplines. One Fellow, for example, commented, "And so we all work in different counseling programs. And so I'm not sure if we would have collaborated in this way had it not been for this project [Peer-to-Peer Mentor Research Team Academy]."

Fellows also discussed ways they can use the networks and partnerships they had established during the academy to sustain research at their institution. One of the Fellows observed that he/she could easily approach his experts from the network to "come talk to my department members, and can you help them understand or conceptualize research and how important research is and manuscript and working together as a team."

They recognized that no single individual has all the skills and knowledge needed to carry out comprehensive and complex research projects. Participants further noted that the interaction with a "diverse audience of health science professionals together working on rehab or disability research"

helped to see research problems "in a different lens." Commenting on the experience with the mentorship program and other trainings, one participant added:

> It actually let me meet two other faculty that I probably never would have met and collaborated with had I not done this [mentorship].

The mentoring experience also provided participants an opportunity to establish personal relationships and friendships, as reflected in the following excerpt:

> It (Peer-to-Peer Mentor Research Team Academy) actually really opened an opportunity where we've actually become very good friends.

Relationships in this context included the opportunity to meet and connect with research leaders in the field, other faculty members, and federal funding agency personnel. One participant noted:

> It is all about the relationships and understanding other relationships towards funding sources and research techniques.

Some of the participants conceived collaboration and networking from a developmental perspective – a process that takes time. One Participant noted:

> Collaboration is a process that can't be completed in a year, so I've watched as their research, as their collaboration, as it grew.

The implementation of the Peer-to-Peer Mentor Research Team Academy promoted inter-institutional scientific collaboration, especially among minority-serving institutions. Participants reported collaboration among minority-serving institutions is critical in the scientific knowledge production enterprise. One faculty member noted: "I think it helps to foster relationships between institutions as a result of this mentoring program, so I see the relationship between Langston and [our institution] growing as a result of that."

Confidence building and motivation. Mentoring is described as critical for building minority-serving institution affiliated faculty's confidence and grit, which is defined as a unique blend of passion and perseverance (Duckworth & Duckworth, 2016). Fellows and mentors identified a lack of confidence as a major barrier to conducting research. Fellows who participated in the Academy generally agreed that the peer-to-peer mentorship "does boost your confidence." University administrators (e.g., deans) supported Fellows' self-evaluation as they observed their confidence to conduct robust research grow. One of them commented, "I think it increased faculty self-efficacy in terms of research." All participants acknowledged that conducting high-quality research could be intimidating, anxiety-provoking, and even discouraging. Although some of the Fellows had participated in grant writing trainings before, they were nonetheless uncertain about their capacity to write a research grant. One Fellow stated, "I think my confidence has increased. I was a novice, too, and it's been a learning experience. My confidence is improved." Another fellow reported, "If I had to measure that [confidence] on a scale from 1 to 10, I'd say it would be a 9."

Mentors and research team members indicated that the Fellows demonstrated growth in their confidence conducting research, increased knowledge and experience in working with their university's

administrative units (e.g., office of sponsored programs), and an enhanced ability to review both manuscripts and grant applications. One of the mentors noted:

> I think I've seen with all of them… from where they started to where they're at now, I think I've seen a huge change in terms of self-efficacy with research, but also self-efficacy with navigating the system in their school to get their research done, whether it's working with their ORSP or working with their IRB and stuff like that. And I think those little things are really important for success in research fields. So I think I've seen huge changes across the whole group.

The mentorship program motivated Fellows to persevere and persist, especially when they felt discouraged. One administrator observed:

> It [mentorship] kept them on track.… They were ready to give up when the first grant was not approved, and they were ready to just pack it in. But their mentors were able to say to them, "Look, this happens all the time. You take the feedback." And they were able to mentor them through the process. I think it's an excellent model.

Research skills and knowledge. Participants described the peer-to-peer mentor research approach as vital for increasing individual and team research skills and knowledge. IRCBIM Fellows, for example, felt that the mentoring program helped them enhance their research skills. Some of the research skills discussed included identifying the problem and developing research ideas, designing a study, conducting comprehensive literature reviews, analyzing data, understanding the research context, building relationships, working in a team, negotiating, compromising, and receiving and using feedback. Fellows stated that they also learned "the importance of focusing on your research interests." Additionally, they described the training on "research statistics and research analysis" as "very, very helpful." One Fellow noted, "it's [mentoring] really increased my capacity and my understanding and my skills in research and in writing." Another fellow commented:

> It has [mentoring] prepared me in different ways and exposed me to that research jargon, that research world, really, especially amongst minority people.

One administrator stated:

> It [mentoring] helps to develop and cultivate that individual so that they become--have the skills necessary to conduct the research that they're doing.

Participants also felt that mentoring helped them develop and see different perspectives on a research problem. Additionally, an administrator pointed out, "it really does serve to ingrain them in the educational process but the research process as well to really pull them in." The mentors noted that the Fellows learned "important research skills in a team setting," such budgeting, how to improve their statistic skills, and also how to distribute the work among themselves. Furthermore, Fellows got "information from us [mentors] about how to develop a grant from start to end." Mentors also indicated that the mentoring relationship was a learning experience for them. When asked to reflect on the benefits of the mentoring program, one mentor stated:

> And personally and professionally, it's been a great learning experience for me because just the learning about the tribal colleges and also the perception about disability and rehab services has

been a great learning experience.

Another mentor added:

> I agree I have actually learned so much from them, and in some ways, it has kind of gotten me excited again about research and other things.

Professional development, tenure, and promotion. Participants discussed how mentoring provided them with an opportunity to gain and improve their professional knowledge and skills and hence become more effective in their positions and job performance. They cited participation in professional development opportunities as one way to advance faculty, their institutions, and learning outcomes among students. For example, participants indicated that mentorship equips faculty "to be better professors with their students."

> And also, professional development, to increase a faculty awareness, and knowledge, and skill, is always a benefit, not only to that faculty member but to the university as a whole.

Additionally, participants felt that mentoring helps early-career faculty scholars overcome obstacles that they may encounter in their efforts to become seasoned researchers. One participant noted:

> It [research mentorship] allows new faculty to avoid the pitfalls that one may encounter as they develop to become a researcher.

Achieving tenure and promotion at many minority-serving institutions is a daunting task. Often, new faculty members may not be aware of expectations for one to achieve tenure and/or promotion. Participants suggested that having a mentor who understands the process of tenure and promotion gives one an advantage in the process. Conversely, they suggested the absence of mentoring opportunities at minority-serving institutions hinders their advancement. One Fellow reported:

> It gave me a perspective of what it takes to progress from being an assistant professor to a full professor and some of the challenges and the struggles along the way.

Support and motivation. Fellows felt that mentors and the RRTC supported and motivated them throughout the mentoring process. One Fellow, observed, "It [mentoring] has been a very, very supportive arrangement." Although participants found mentoring to be exciting, they acknowledged that there were times when they felt overwhelmed with competing demands such as teaching, student advising, administrative, and family responsibilities. Because of these competing demands, a majority of the Fellows reported that they missed attending some meetings or did not complete assignments on time. Fellows explained that the support and motivation they received helped them overcome the challenges. For example, they reported that mentoring "created that sharing opportunity" and helped to get the services they needed.

> My mentors have been amazing and have really offered guidance across manuscript development, across career advice, every aspect. They were very responsive to everything we needed.

Support and motivation are especially vital services mentoring service for early-career researchers or new faculty to minority-serving institution environment. For example, participants felt such kind of faculty need a lot of support as they seek answers to a myriad of questions they may have as they adjust to the new environment.

> I think mentoring is essential, whether it is here or anyplace else. You have people coming in as new faculty members who've never taught before, or they may have taught somewhere else, and things are done differently here. And I know it helped me immensely to have somebody that I could just ask questions to, ask questions of, talk to about things, just spin ideas off of, just whether it's about teaching, whether it's about the administrative aspects of being a faculty member.
>
> I think one of the great areas of growth for them all is the degree to which they are drawing on outside resources in the instance.

Success in graduate school. Some of the Fellows identified mentoring as critical for one to succeed in graduate school. Fellows reported that several faculty members at minority-serving institutions do not have terminal degrees. Fellows who were pursuing a master's or Ph.D. degree described their participation in research mentoring as key to their success in graduate school. One of the Fellows excitedly reported that "I scored a hundred percent on my research plan because a lot of it I learned from him [mentor]." The fellow added, "Everything we've learned so far is being carried over into a course work."

Fellows who were pursuing a Ph.D. degree reported that their participation in the mentoring program helped them to get on track, focus on their research, and begin to have a good grasp of their research goal. One of the Fellows observed:

> I didn't have a lot of experience in research. And now that I'm still in grad school, everything's come together. It's going—all the pieces of the puzzle are making sense now. And I've got that edge, versus my classmates that do not have this opportunity for technical assistance and enriching everything.

Fellows reported that mentorship opportunity also gave them access to "a pool of minority professionals and doctors" that were inspiring them to become accomplished researchers. One of them observed:

> We are both clinical instructors… And definitely, research is almost not prioritized as much for us. But we're both Ph.D. candidates, so this program has been essential in getting us on track to do our research and to develop our agenda. So definitely, without it, we wouldn't have had the opportunity to develop our research agenda. So I'm grateful for that, and all the resources, without a doubt.

Category 2: GRANT WRITING AND MANAGEMENT TRAINING

The IRCBIM seeks to build the grant writing skills of participants, and this training is essential to enhancing the frequency of competitive proposals submitted by minority-serving institutions to NIDILRR and other federal agencies for funding consideration. Model participants engaged in grant writing training either on the campuses of their respective institutions, via webinar, or in person at LU-RRTC sponsored events during national conferences as an innovative strategy to increase their research productivity.

Grant writing skills and knowledge. Participants discussed how the training "built their capacity" and gave them "a better understanding of the grant writing process." They also perceived the training as giving them the tools to help them be able to pursue independent proposal development. One participant noted, "It [training] strategically taught me how to tackle the research." A review of documents also indicated that participants gained knowledge on the federal grant funding landscape, with an emphasis on NIDILRR and NIH funding mechanisms, the elements of a typical application kit, usual NIDILRR and NIH grant selection criteria, a recipe for successful grant writing, and building infrastructure to write successful grants and manuscripts. Commenting on the importance of grant writing training, one of the administrators observed:

> It would be awesome for them to understand how grants work and how when you're doing budgets and when you're--what are allowable costs, what are not allowable costs.

Enhanced scholarship. Other participants felt that the training enhanced their overall scholarship. In other words, participants felt that participating in grant writing training not only increased their fund of knowledge but also shaped their character, attitudes toward research, and scholarly engagements.

> I think one of the benefits was just enhanced scholarship, being able to enhance our scholarship, also being able to, again, collaborate across programs, whether it was rehab, or clinical mental health, or school counseling, that was really beneficial.

Awareness of federal research funding opportunities. Participants reported that their awareness and knowledge about federal research funding entities (e.g., NIDILRR and NIH) increased.

> I think it actually opened my eyes also to different types of grants that are available and ways you can take what you're doing and look in other areas.

Mentors concurred, as one of them observed:

> I think we've expanded their horizons on NIDILRR and whatnot. I also think we expanded their horizons in thinking of, this is a good idea. We'll go for NIDILRR stuff, but this may actually apply to other sources.

Finding research funding opportunities, even for the most experienced, can be difficult. For instance, many participants in this study did not know, for example, anything about NIDILRR and its various grant funding opportunities. Accordingly, they identified a lack of awareness about federal and private funding opportunities as one of the major obstacles to the advancement of the research enterprise at minority-serving institutions. One participant noted:

> I think an advantage to it [IRCBIM model] is that not all the times in minority institutions we are aware of those opportunities. And so, if we have mentorships, manuscript development, grant writing development, then we're aware of what resources are out there for us to apply for, what to write grants for, what's the best manuscripts to submit for review?

To increase awareness about grant funding opportunities, participants suggested that "understanding all the different levels and foundation grants and other possibilities could be helpful." Some administrators stated that they have initiated "faculty development grants" to help those interested

in grant writing understand the funding landscape. Such initiatives, as the administrator noted "would expose more people [faculty] to see what's out there outside of practice and outside of teaching opportunities."

Empowerment of researchers. Empowerment of researchers was cited as one of the desired outcomes of grant writing training. Participants reported that writing successful grants is hard. One of the participants noted, "a lot of people are scared of grants." However, participants felt that the training helped to demystify the grant writing process. Subsequently, participants, especially Fellows, felt empowered. For example, one of the participants noted that "it [training] definitely helps build capacity and capability." Participants identified several opportunities such as participating in actual research projects, presenting their work at conferences/meetings, peer-reviewing proposals before submission, webinars, working with capable mentors designed to improve their skills, and competencies as key to feeling empowered. Participants also felt empowered because the training focused on harnessing their strengths and not cataloging their weaknesses. One participant, for example, stated:

> I feel more empowered, stronger skill set to do those things [writing proposals and manuscripts]." Another fellow added, "I think that the training in the grant has been very helpful to make us much better researchers.

One of the administrators explained that writing successful grants promotes independence among faculty scholars.

> I also think having a grant writing workshop empowers faculty because with the grant dollars comes a level of independence, and I think faculty welcome independence.

Self-confidence and self-esteem building. Individuals who have high self-confidence tend to experience increased self-esteem. Having the confidence (i.e., an individual's perceptions of overall capability) to write grants was identified as a significant outcome of participating in the training. Generally, participants appeared happy when discussing their experiences writing grants. One participant noted, "I think it's [grant writing] had a very positive impact on my confidence and my skill set, without a doubt." Fellows partly attributed their increased confidence and increased self-esteem to the mentors. For example, one Fellow reported, "I'm working with seasoned professors or faculty that are able to not just facilitate but to guide the process of research."

Mentors concurred with Fellows, as one of them observed:

> I think it [grant writing training] would help them in feeling comfortable applying for the grant in the first place, writing a better grant proposal. Maybe it would also help in terms of their willingness to look for other funding opportunities.

Category 3: MANUSCRIPT DEVELOPMENT TRAINING

Fellows and faculty members participated in manuscript development training as an approach to enhance their technical writing skills in developing high-quality manuscripts for refereed journals and knowledge about adhering to editorial expectations and requirements.

Manuscript development and publication skills and knowledge. Participants noted how the training helped to enhance their skills in this area. Enhanced manuscript development process skills

and knowledge emerged as one of the advantages of the training. Several participants reported that developing manuscripts, especially within a research team context, helped them enhance several skills such as assembling the manuscript team, negotiating authorship, peer review, selecting a journal, and where to submit the manuscript.

> We find a journal that we want to write in. We use samples, so we can understand what they're looking for, what they're looking for, and then we divvy up what we're going to do based on our expertise.

The training also helped participants enhance their writing skills. Participants stressed that effective writing skills help to facilitate effective communication of ideas and concepts in an organized and coherent manner. One of the participants, for example, noted that they learned "how to write a better abstract or how to write clear enough so, people understand your objectives. So honing your skills."

Category 4: COMMUNITY OF PRACTICE

The community of practice was described as an excellent forum to share information, ideas, and experiences, expand knowledge and skills, and network with highly educated people dedicated to research topics relevant to minority-serving institutions and communities of color. Below we describe themes that emerged under this category.

Cross-fertilization of knowledge. Fellows in the mentorship program perceived the community of practice as a critical opportunity for cross-fertilization of knowledge where the experience of each member increased the capacity of others. Participants argued that there is "a lot of value in getting those partners together to talk about what they've already worked out", thus minimizing the chances in duplicating efforts. One participant noted that "I think the advantage is to share knowledge and to look at some of the solutions that maybe another organization came up with and what they found works best for them and their students."

The community of practice was also seen as an arena for improving research methodologies and stimulating innovation by utilizing cross-fertilization of knowledge. Subsequently, the community of practice can contribute to a culture of innovation (i.e., incremental or evolutionary) – an environment that encourages and supports the adoption of new research practices, inter educational learning, or paradigm that lead to the achievement of desired R&D outcomes. Engaging in the community of practice was conceived as an opportunity that facilitates the understanding of the full complexity of the research environment at minority-serving institutions. One administrator noted:

> The community of practice is very important because one person is not a repository of knowledge. And different environments bring different experiences.

Platform for problem-solving. The community of practice provided participants a platform for problem-solving – a space where they discussed challenges they experienced in their environments and identified strategies for overcoming them. Participants also felt that the community of practice provided them a forum for learning best practices and developing new ideas. For example, participants identified discussions on research barriers unique to minority-serving institutions and strategies to overcome identified obstacles (e.g., effective time management) as some of the topics they found most relevant.

Participants noted that the community of practice allowed them to realize that whatever the issues they were studying were not germane to their institutions.

> When faculty or anyone else, researchers, whomever, come together with others outside of their normal day-to-day interactions, then conversations around what happens at that institution, what are the better practices or what do you find that are successful, so that's an advantage of coming together to kind of discuss experiences.

Networking and support system. Participants reported that connecting with other people who are also learning provided "a support system and ideas." Some of the participants reported that having a forum "to share our struggles" was encouraging. Participants also noted, "just hearing the different instructors at bigger institutions having similar issues and being able to share our struggles but also share what works and how they overcome different barriers has helped."

Participants felt that the community of practice intervention was especially needed at minority-serving institutions where the ecosystem for supporting research capacity building lacks development, especially when compared to many of the PWIs. One participant observed that engaging in the community of practice helped "them [Fellows] to understand that "Okay, I'm not alone "and also feel motivated to find solutions to challenges to encounter while participating in research activities.

Validation of research generated at minority-serving institutions. Participants felt that the community of practice validated their experiences as well as the research that they were pursuing. Some of the participants complained that many scientists at majority institutions (i.e., PWIs) often devalue knowledge generated at minority-serving institutions or through Indigenous methods of inquiry. Subsequently, faculty scholars based at these institutions often find themselves doubting and questioning their own experiences, abilities, research projects, and/or research products (e.g., peer-reviewed articles). One participant observed:

> I think one of the advantages, it [community of practice] validates their experiences as well as the research that they are pursuing. When you are part of a community of practice, you're looking at a group of people who have similar interests, and I think it helps to validate that individual.

Institutional development. Participants felt that participation in the community of practice contributed to the overall capacity of their respective institutions. One Fellow stated, "the overarching benefit is to make our institutions better."

Category 5: TECHNICAL ASSISTANCE- INFRASTRUCTURE ISSUES CONSULTATION

The model embraces strengthening or building research infrastructures as a core component of comprehensive research capacity building. Overall, this category underscores the importance of providing contextualized and customized technical assistance and consulting services aimed at developing new or enhancing existing research infrastructures. Below we discuss seven distinct themes (i.e., strategic planning, strengthening research governance structures, creating a pipeline to diversify

the scientific workforce, developing a culture of research, improving student-learning outcomes, and institutional prestige and advancement) that emerged under this category.

Strategic planning. Strategic planning, which refers to a systematic process focused on making strategic decisions, contributes to institutional effectiveness. Participants generally agreed that a well-formulated and implemented strategic plan could have an enormous multiplication effect on minority-serving institutions. For example, many participants who were directly or indirectly involved in the process of developing the strategic plan felt that the planning process allowed them an opportunity to participate in making decisions about the research direction of their respective institutions. Participants also reported that the strategic plan was important because it helped institutions to "set the strategic goal" and provided a disciplined approach to improving research capacity building and research infrastructure. Some participants described strategic plans that were developed at their institutions as a "road map" or a "manual", which tells "you where you need to be and how you should be in the future."

Also, some participants reported that the strategic plan helps identify strategies and resources to improve the institution's research capacity and infrastructure. Some participants felt that the strategic plan was essential because it provided a roadmap on how to overcome some of the challenges. "Because even with limited resources, you still can do great work, so you learn to work around it." One Fellow, commenting on the importance of having a strategic plan, observed:

> It is a manual. You need that manual. And then it makes people put things down on paper, and that becomes a road map for someone else, and it's excellent.

Participants also expressed that developing a strategic plan not only provided a much-needed opportunity to discuss and share ideas but also allowed them to understand the context (e.g., community needs and policy environment) under which the plan will be implemented and engage community stakeholders. According to the participants, strategic planning was an effective way to respond to the diverse and unique needs of the community. One participant staff member observed:

> You need to know the needs of the community so that you can better serve the community and build your strategic plan around the community needs.

Participants also described the strategic plan as a critical tool that can facilitate strategic resource allocation decision making. One faculty scholar stated, "I see a strategic plan in terms of who would be those mentors? What kind of workload would they have in terms of a decreased workload? What kind of responsibilities would they have?" Another participant noted, "It's [strategic planning] a huge thing with the budget, and it's a huge thing with where resources are going to be allocated."

Strengthening research governance infrastructures. Improving the institutional systems that govern research was perceived as a critical component of research capacity building. Participants credited technical assistance provided through IRCBIM to streamlined functions of critical research institutional systems (e.g., office of sponsored programs) that promote research governance. Participants applauded the training offered to administrative staff on how to improve administrative units responsible for facilitating research. Some Fellows identified a better working relationship with administrative staff,

processing of grant submittals, execution of contracts, and pre-award and post-award processes as some of the areas that had witnessed remarkable improvement. One of the Fellows observed:

> And from the time I started the Fellowship until now, the process has become very easy with the office of sponsored programs and the contracted agencies.

Creating a pipeline to diversify the scientific workforce. Participants lamented the dearth of researchers of color available to give voice to the issues that may be unique to minority communities. Moreover, they noted that the nation's future scientific research workforce is dependent on a diverse pool of highly qualified researchers. Pointing to the focus group participants, one Fellow observed:

> I mean just sitting here and looking at the diversity here, I mean we all don't have the same issues, and they are different. And when you empower people, then you give a voice to that group.

There should be no reason why minority-serving institutions experience inadequate numbers of qualified disability and rehabilitation researchers. However, participants generally agreed that limited research capacity building opportunities (e.g., IRCIBIM) are a major contributing factor to low participation of these institutions in cutting-edge scientific research. Implementing capacity building activities at minority-serving institutions using IRCBIM was thus seen as an innovative strategy for developing a pipeline for researchers based at minority-serving institutions to undertake high-quality research, which will inform interventions that improve the lives of individuals with disabilities from traditionally underserved racial and ethnic groups.

> I think, for the students, it would give them something - eye-opening, especially if you're looking at going to the master's level as well as doctoral level.

Developing a culture of research. Participants reported that IRCBIM is contributing in significant ways to the development of a research culture at the institutions that received the intervention. One Fellow reported, "I'm going to import what I learn as a fellow into my department so that I can stimulate research." Many participants noted that the expectation to conduct research has increased at minority-serving institutions. Subsequently, more faculty members are interested in research opportunities. To demonstrate research culture transformation at some minority-serving institutions, one participant observed, "Now students want to know how many publications the faculty have." Representing a drastic paradigm shift – from a focus on teaching to a focus that recognizes research and innovation as a core mission of minority-serving institutions. Further, pointing at their research accomplishments, faculty scholars at these institutions have begun identifying themselves as academic researchers who are engaged in the production of knowledge.

> I think it [IRCBIM] definitely helped us get published. I mean, we've submitted three manuscripts, two have been accepted, the third one's under review.

Participants also underscored that having faculty engage actively in research production and knowledge generation will help socialize their students into the research culture. When students see their faculty engage in research and talk about their research work, they will start to see the value of research. In this process of role modeling, students learn about the attitudes, skills, behaviors, and actions needed

to be a successful researcher. Subsequently, they would develop the confidence necessary to participate in research at an early stage and, in turn, start shaping research culture at their respective institutions.

> If we understand more about how to do it [research], we'll be able to do it better and in a way that helps the students, which is our big goal—helping the students—more so, because they'll understand as they go on in the world, the possibilities and understanding doing research helps you understand other things out there.

Improving student learning outcomes. Developing researchers was also seen as an innovative strategy for improving learning outcomes among students at minority-serving institutions. Participants argued that IRCBIM "will ultimately impact our students," especially given that many of them "are first-generation students" with no role models in the research arena. For example, participants argued the benefits of building the research capacity of faculty scholar will trickle down to students. One of the participants observed that "these things [IRCBIM capacity building activities] that are implemented can only help the students become better writers." Another participant pointed:

> There are several layers of increasing productivity in the scholarly realm, whether it's scholarships, or whether it's grants. I think there are several layers of it. I think from my perspective; I view those kinds of layers always improving students and student learning.

Participants, especially at the TCUs, were concerned about the lack of adequate data on Native Americans and tribal schools. One participant simply stated, "There's not a lot of data on them [Native Americans]." One participant stated:

> If we understand more about how to do it [research], we'll be able to do it better and in a way that helps the students, which is our big goal—helping the students—more so, because they'll understand as they go on in the world, the possibilities and understanding doing research helps you understand other things out there.

Furthermore, participants argued that more opportunities are needed to widen the pathways that prepare minority-serving institution-affiliated scholars and students for disability and rehabilitation research careers. They complained that minority-serving institutions leaders and federal agencies are not investing enough financial resources in research capacity building and the enhancement of research infrastructures.

Institutional prestige and advancement. It was evident from the interviews, focus group discussions, document reviews, and site visit observations that minority-serving institutions, like many institutions of higher learning, aspire to rank among the top universities and colleges and rise in the classifications of higher institutions (e.g., Carnegie Classifications of Institutions of Higher Learning). Participants frequently explained their importance of building their research capacity at different levels as they endeavor to position their institutions and affiliated scholars to play a critical role in the R&D frontier. One administrator observed that research capacity building would improve the institution's "stance as a research institution locally, regionally, nationally."

Category 6: RESEARCH SUPPORT RESOURCES

As a part of the Research Support Resources area, each minority-serving institutions was

provided mini-grants supplements in the total amount of $100,000 ($25,000 per year over four years) via sub-contract. Participants used the mini-grant supplements to address research priority needs unique to them. The following themes emerged:

Incentives. Participants from all institutions indicated that the financial resources available to them as a part of their participation in IRCBIM was a great incentive. For instance, the Fellows felt appreciated and recognized for their hard work. They also expressed their gratitude. One Fellow observed, "Langston [RRTC] has provided me with opportunities that I would never have gotten anywhere else, and I think it has been a blessing to be a part of it."

Participants discussed that incentives provided came with clear expectations and accountability requirements. One of the participants stated:

> You're held accountable, and you're held to a standard of maintaining all of the knowledge you gained, and then what are you doing with it.

Professional development. All participants generally agreed that professional development plays an important role in deepening faculty members' research and instructional capacity. They complained that they seldom have access to professional development opportunities to help them hone their teaching and research skills because of financial challenges their institutions faced. Consequently, they used part of the financial resources provided to them for the faculty's professional development. For example, Fellows reported that they used part of the seed monies they received to attend professional conferences such as the International Council of Nurses Congress in Barcelona, American Rehabilitation Counseling Association (ARCA), National Association of Multicultural Rehabilitation Concerns, and the National Indian Educators Association Conference. Accordingly, both faculty and students had the opportunity to network as well as increase their knowledge. Participants conceived professional development opportunities as one way to advance strategic goals and objectives. These goals and objectives include improving learning, retention, and graduation outcomes among students. One research reported:

> We are including student workers to assist the Fellows. This involves students within the research process and provides them with valuable experiences while at the same time assisting the Fellows.

Membership in professional organizations. Affiliation with professional organizations was identified as an integral component of the professional growth and development and congruent with institutional mission. Participants thus explained that they used some of the mini-grant dollars to become members of professional organizations (e.g., National Congress of American Indians (NCAI) organization and the Childhood Arthritis Rheumatology Research Alliance Organization). A review of progress reports participants submitted showed membership benefits included, "discounts on future conferences."

Preparation of the next generation of researchers. Institutions reported that they used a portion of their subcontract amount to support faculty members who were pursuing graduate studies

with tuition. One of the faculty Fellows who received tuition support stated, "My experiences have, as a fellow, enriched all aspects of my career, graduate student work and my role within … the community."

Overall satisfaction with the model. Overall, participants described IRCBIM as "very strong" and "an excellent model." One faculty member observed, "If you're serious about actually developing minority researchers, this is a great program to implement." The structure and capable mentors were some of the strengths of the model. One administrator noted, "That structure was really wonderful. And the expertise - for them to have people with experience."

Generally, participants were not only satisfied with the model but also called for its implementation across minority-serving institutions. They explained that the model was helping to bring attention to the scientific community that "minority perspectives are important" to solving complex challenges that individuals with disabilities face. Additionally, participants reported that IRCBIM was an impact on students' research experiences, thus contributing to the development of researchers of the future, as one Fellow observed:

> And our perspectives are valuable. And that's going to transmit to students, our students too. They will be the future researchers, and they are going to change rehabilitation, vocational rehabilitation in the near future.

Category 7: TECHNOLOGICAL SUPPORT AND CONSULTATION

The presence of technological resources without timely access to technical support to ensure proficiency in the specific digital technology will not lead to meaningful capacity building among the end-users of the technology. Accordingly, participants received technical assistance to help build a responsive informational technology infrastructure supportive of faculty scholars' and students' rehabilitation research agendas.

Improvement of research infrastructure and technology. Participants stressed the need for continued capacity building efforts to increase proficiency in the use of new technologies that support research (e.g., developing competencies in the use of NVivo and SPSS) to analyze data. Some participants reported that the financial resources they received for participating in IRCBIM helped them purchase research infrastructures. They explained that they strongly believed that access to infrastructures that support research was central to reducing R&D challenges they were facing. For example, some institutions purchased library reference materials and computers to facilitate research.

Additionally, most of the institutions bought different types of statistical analysis and data management software (e.g., SPSS, NVivo, and Atlas.Ti), which they described as essential to analyze and manage quantitative and qualitative data as well as to accomplish their research projects. A review of documents revealed that the purchase of software licenses facilitated "collaboration as well as independent work." One Fellow observed:

> Just the use of the funds has been—we've benefited greatly from it, putting the dollars toward things that we wouldn't have been able to do if we didn't have this grant."

Category 8: CHALLENGES

Building research capacity at minority-serving institutions is a challenging endeavor. Due to the their research ecosystems and ability to adapt to new interventions, scientific capacity is shaped by the confluence of internal and external contexts such as administrative culture, condition of research infrastructures, student body composition, cadre of faculty scholars, community needs, technological advancements, state and federal government policies, and research funding mechanisms and priorities. Generally, however, the advantages of research capacity building at these institutions outweigh any challenges and costs. Below we discuss key challenges.

Research teams related challenges. Many of the participants, especially Fellows, did not have adequate experience working in multidisciplinary research teams. The cultural differences between disciplines and geographical separations were cited as practical barriers. Furthermore, participants singled out different experiences (i.e., research credentials, qualifications, skills, and knowledge) and personalities as accompanying issues that they had to manage. For example, some of the faculty members at TCUs have not obtained their doctoral degrees; hence they may not have advanced research skills and knowledge needed to carry out robust research agendas. This finding is consistent with previous reports, which indicate that recruiting and retaining faculty with doctoral degrees to teach and conduct research at TCUs is a long-standing problem (American Indian Higher Education Consortium, 1999; Voorhees, 2003). The intersectionality of these individual and group factors made participation in multidisciplinary research teams a challenging experience. However, the challenges also provided Fellows and mentors the opportunity to develop and grow research skills such as negotiation, problem-solving, and interpersonal communication. In a few situations, challenges were transformational. Especially in transdisciplinary research teams where members contributed their knowledge and expertise but also allowed the best ideas to determine the research process.

Scheduling conflicts. Scheduling conflicts also emerged as a major challenge. For example, Fellows reported that sometimes it was difficult for them to meet with mentors because of scheduling conflicts. We also found it challenging to schedule, coordinate, and conduct campus-wide capacity building activities such as grant writing and manuscript development trainings because of scheduling conflicts. Subsequently, some institutions received some of the interventions toward the end of the IRCBIM implementation. Possibly the impact of these activities was not captured during the evaluation because it takes time to start seeing changes after implementation.

Institutional differences. Participating institutions and affiliated participants did not have the same research capabilities and needs. For example, some institutions did not have administrative units such as the institutional review board (IRB), and others did not have adequate well-trained administrative staff. Others, when compared to their counterparts appeared to have relatively well-developed research governance units such as the office of sponsored programs. Similarly, at the individual level, for example, some Fellows possessed advanced research skills while others were very new to the research arena. Because some institutions and individuals participating in IRCIBIM were "at different stages of development" from a research capacity building perspective, it was not surprising to

experience implementation challenges such as how to provide mentoring services (e.g., research idea conceptualization and data analysis techniques) to the research team in a manner that did not exclude the needs of each team member. It was also a challenge for administrators (e.g., deans and departmental chairs) to provide more release time to individuals who needed more time and effort to hone their research skills.

Limited mentorship and research leaders. Inadequate mentorship and role modeling opportunities emerged as a major obstacle. Participants reported that minority-serving institution affiliated faculty scholars and students seldom have access to mentorship opportunities. For example, participants noted that having Fellowship opportunities such as the one provided through LU-RRTC was rarely at minority-serving institutions. Participants felt that inadequate mentoring opportunities could slow research capacity building efforts at minority-serving institutions and, by extension, federal efforts aimed at developing the next generation of culturally competent disability and rehabilitation scientists. Correspondingly, there exists a dearth of seasoned research leaders available to provide informal mentoring and serve as role models for early-career faculty scholars and students.

Time management. Participants frequently cited lack of time as a major challenge to participation in research capacity building activities. For example, faculty scholars (e.g., Fellows), mentors, and administrators reported that teaching, student advising, community service, and administrative responsibilities made it hard for Fellows to integrate capacity building activities fully in their daily agenda. They further reported that lack of time hindered their research productivity. To address this challenge, institutions and Fellows received technical assistance on innovative strategies such as providing Fellows protected time to do research and reducing service and administrative responsibilities. Fellows also received time management strategies through peer mentoring and information sharing during community of practices sessions.

Inadequate human resources. Some of the participants (e.g., administrative staff) reported that most of their units were understaffed. Often, they felt overwhelmed with carrying job duties that needed two or more people to accomplish. For example, one participant commented that "our grants office is so limited, they have two people in it." It was apparent that the philosophy of "doing more with less" that most minority-serving institutions embrace, although needed due to financial constraints these institutions experience, was having severe negative effects such as increased work-related stress and decreased morale.

High turnover. Undesirable turnover among university administrators, staff, and faculty were identified as a major impediment to research capacity building and infrastructure development efforts. Due to the fact it came with significant tangible (e.g., money spent to hire and train new employees, and lost productivity) and intangible costs (e.g., knowledge, experience, and relationships). For example, a few participants reported the implementation of the strategic plans were facing obstacles due to turnover of administrators who participated in the development of the plan. They explained that leaders at minority-serving institutions (e.g., university presidents) play a monumental role in project implementation by ensuring strategic consensus and proper allocation of resources. One participant observed, "I think that one of our biggest challenges is that turnover."

Limited peer-review opportunities. The critical role peer-review plays in scholarly publishing, and research funding was underscored. However, many participants reported that they had never participated in the peer-review process. For example, all Fellows reported that they had never participated in the federal funding peer-review process. They thus greatly appreciated the fact that IRCBIM participation provided them an opportunity to start immersing themselves in the pre-publication peer-review process. One Fellow commented that "getting a chance to present our research and get feedback from other people" was a great benefit. Another fellow was excited to report that "I was able to apply to become a reviewer, peer reviewer for NIDILRR."

Inadequate research infrastructures. Research infrastructure is a critical component of scientific knowledge creation. Many participants felt that inadequate research infrastructures at their institutions either hindered them from fully engaging in IRCBIM research capacity building activities or impeded the development of a culture of research. Some participants described research infrastructure (e.g., databases, data collection, and management software, IRBs, office of sponsored programs, and comptroller's office) at their institutions as inadequate and ineffective. Some participants complained that there was a lack of knowledgeable staff in charge of research administrative units. Participants expressed the need to continue building robust research infrastructures that support complex scientific investigations such as those supported by NIDILRR and other federal agencies that sponsor cutting-edge research. One participant observed:

> One of the frustrations that I hear from faculty is in terms of impediments to the research, is the lack of infrastructure in terms of lab space and lab equipment.

Devaluing scholarship produced at minority-serving institutions. The tendency to oversimplify and devalue scientific knowledge generated at minority-serving institutions was highlighted as a challenge. Some participants emphasized the need to value research equally irrespective of the institutional affiliation of the researchers. One participant noted, "I think we function a little bit maybe differently than other institutions in some ways. So, we have a different history, a different model." Devaluing knowledge generated at minority-serving institutions can have several far-reaching negative psychological consequences at the individual and collective levels. First, the self-esteem of scholars and students affiliated with these institutions may be lowered, which in turn would decrease their self-confidence. Accordingly, an individual whose self-confidence and self-esteem is eroded are more likely to avoid engaging in robust research production. Second, collectively, minority-serving institution leaders may be discouraged from prioritizing research. Third, research-funding agencies may not see the need for investing research funds at these institutions. Table 16 shows themes for IRCBIM implementation challenges at minority-serving institutions that were generated through qualitative analysis with illustrative exemplars. Table 17 provides strategies for addressing these identified challenges.

TABLE 16. Themes on Model Implementation Challenges with Illustrative Exemplars

Theme	Illustrative Exemplars
Lack of a critical mass of researchers at minority-serving institutions	We don't have a pool of researchers--or people with terminal degrees, for that matter--to go to and ask, "What do you think about this?" We're just relying on outside people, our consultants.
Multidisciplinary challenges	We struggle with that [multidisciplinary teams] because every discipline is different.
Coordinating schedules	I think the challenge is in scheduling, because, unfortunately, the last two sessions for the new faculty development program have been when I've taught.
Cost	I think cost would be as big of an issue.
Different research capabilities	The challenges are the various levels of skills and commitment. Some people need very basic, very entry level information, where their mentor is cruising at the 30,000-foot level, and they don't really have time to explain everything and they expect them to catch up.
Limited mentorship opportunities	I think that the biggest challenge is just getting the right qualified people to be mentors. It's very difficult.
Distance learning challenges	I think that we've come a long way as far as being able to Skype or video. Because at one point, it would have been a lot more difficult because usually your mentors aren't anywhere close. And so you're trying to rely on phone calls and that kind of stuff, whereas now you can Zoom or you can Skype, and so it does make it a little bit handier to actually then be able to see and to work with other people.
Cultural competency	There's no cookie-cutter approach. And tribes face that time and time again with all the federal agencies that they interface with our way of life and being of distinct political status.
Inadequate time	I think it's definitely going to be a challenge with regard to the time management, because I know most of the time, the lack of faculties and the course load for the faculties put them in a place that they are not spending much time on research. So that would definitely be a challenge, and at the same time, whatever ongoing research.
Matching mentors with Fellows	The challenge is the mentor knowing that this is something he or she wants to do, and the mentee recognizing that this has help or a potential to improve the quality of their scholarship. So to me, that's the biggest challenge I see.
Institutional problems (self- concept)	One of the things that has been a struggle, and I think is probably a struggle for other minority--for other even smaller institutions, is that they see themselves as teaching, as having--as not, when they say research, they say, "Well, that's a research one institution." So transforming the mindset is one of the first things, and the same is true with students.
Lack of awareness	there's probably less awareness at minority-serving institutions of what's available and less training of the skills needed to do research and get funding.
Mentorship socialization	I think, in the beginning, the challenges were we didn't fully understand what it was, which I think it came together afterwards. We all were under the impression we're each going to do our own little research idea and topic, and we were so surprised, they're like, "Oh, no, you have to find one together."
Lack of funding	I think a lot of the minority-serving institutions are lacking a lot of things because we don't have the kind of fund that other institutions have. We do not have the capacity that other institutions have.
Infrastructure challenges	Unfortunately, so many of our minority-serving institutions don't have that infrastructure, or they haven't thought through how to develop that infrastructure to really become more active in the research space.
Lack of mentors	some professors don't like to mentor. That's the first challenge.
Lack of participation	So one of the challenges may be getting the faculty here, getting the faculty to participate. Faculty get a lot of emails they may not read.
Lack of resources	Resources are always a challenge as well, having the resources to fund any type of new initiative, for that matter, for the organization. That's always a challenge as well.
Lack of software experiences	But we lack a little on SPSS experience.
Leadership turnover	One of the challenges that I've experienced as a fellow … is the turnover that we experience. And not only with some of our faculty staff, but our students as well. And so, we have an issue with retention at all levels.
Scheduling conflicts	I did not attend every single one, and it was difficult because the planning of those [research activities], we always had a time conflict or obligation that we had at the college.
Heavy teaching load	I think that faculty at a lot of minority-serving institutions also tend to have heavy teaching loads and tend to be researchers but not sort of--they're maybe not as well trained or there's not as many resources as if you were at more of like a Research I or something.

Lack of incentives	Not being able to get, let's say, course release time or things like that to really facilitate those processes has been, I think, the major challenge for the Fellows.
Mentor turnover	Challenges have been turnover here … and within the Peer-to-Peer Mentor Research Team Academy mentorship. The consistency also of the mentors, like I said, that was a hurdle.

TABLE 17. Strategies for Addressing Identified Challenges

Strategies	Exemplars
Build critical mass of researchers at minority-serving institutions	We don't have a pool of researchers--or people with terminal degrees, for that matter--to go to and ask, "What do you think about this?" We're just relying on outside people, our consultants, so that IRB(?) training alone brought somebody to us that has experience working in communities to improve that.
Embrace research	For us here, being that we're a teaching institution, we're not research-focused, so we don't, even within our--over the years, we haven't applied too often to the NIH because it's so focused on health care and so competitive.
Empower human resources	Resources, resources, resources. Human resource professionals who are very well-vested in that area, who come to reinforce, giving us books or materials that we can refer to when we-- So that it's a lifelong, I'll put it a lifelong process, that we keep on learning. We keep on learning.
Maximum use of limited resources	I think here we have to bring in more players. It can't just be Little Priest; it needs to be in conjunction with the education department. It needs to be in conjunction with maybe the Peer-to-Peer Mentor Research Team Academy at the school.
More funds	I would love to see the funding agencies offer more professional development opportunities. But then I would love to see them also have more requests for proposals that will allow institutions to acquire funding to then be able to do it on their campuses, to pilot something that is more type specific for their institution, native to their institution.
Protecting time	It's always just time, because we're a teaching college primarily, and so carving out the time.
Provide sustained training	Training and making sure that, I mean we get the training theoretically to refresh ourselves so that we always are not wandering off.

Discussion

The purpose of this study was to evaluate the feasibility and perceived effectiveness of IRCBIM, which the LU-RRTC designed to enhance disability/health and rehabilitation research capacity and infrastructure at minority-serving institutions. This model was conceptualized and field-tested over an approximate 3 ½ years in response to long-standing concerns (Moore et al., 2000) about the under-participation of HBCUS and other minority-serving institutions and their faculty scholars in the disability/health and rehabilitation R&D enterprise. The findings suggest that survey respondents, interview key informants, and focus group participants (all collectively referred to as participants in this section) perceived the models as promising tool for helping to enhance early-career faculty scholars' scientific abilities and productivity, and institutional research infrastructure. This section discusses key findings and how they might help translate solutions to R&D performance challenges.

Impacts of IRCBIM on Research Capacity

Overall, our evaluation findings showed that participants perceived IRCBIM interventions that were introduced to their campuses over a three year, five-month period (approximately 3 ½ years- from December 4, 2014 to May 31, 2018) as positive contributors to increased institutional and individual

disability/health and rehabilitation research capacity. Nearly all of them (i.e., Fellows/faculty, mentors, administrators, staff, and students) consistently expressed total satisfaction with IRCBIM. Accordingly, the findings suggest that the IRCBIM represents a promising approach for building the research capacity (i.e., strengthening research infrastructure and faculty scholars' methodological and grant writing skills) of minority-serving institutions. Consistent with the structural empowerment theory and capacity building principles, all seven intervention components delivered to participant institutions' milieu as a dosage encompassed empowerment elements. However, the dosage needed and delivered to each institution varied from one to another because their research ecosystems were not homogenous.

Model Components Perceived Effective for Strengthening Scientific Capacity

Generally, all seven-intervention components of the model (i.e., peer-to-peer mentor research team model/academy, technical assistance-infrastructure issues, grant-writing training, manuscript development training, communities of practice, research support resources, and technical support and consultation) were mutually inclusive and each positively contributed to the success of the model. Quantitative and qualitative evaluation findings indicated that the Academy, a core model component, was successful in helping Fellows to increase their research skills (e.g., methods and grant writing). As they learned new research skills and received mentoring support, Fellows became more confident about their ability to carry out scientific research and demonstrated increased research leadership skills. Research productivity (as measured by number of proposals submitted or funded, peer-reviewed articles published or submitted for publication consideration, and presentations made at conferences/meetings) increased across all five minority-serving institutions participating in IRCBIM. Specifically, participating institutions submitted seven disability and rehabilitation related research proposals to NIDILRR/NIH and other related agencies. Of the seven proposals submitted, Academy Fellows as Mercy College won for the first time in their career a competitive three-year $600,000 NIDILRR Field Initiated Project grant. In addition, IRCBIM Fellows developed eight peer-reviewed publications (19 co-authorships) and made a total of seventeen different research presentations at national and international conferences.

The primary research productivity measures consisted of writing and submitting a proposal for competitive funding consideration to NIDILRR's Minority-Serving Institution-Field Initiated Program (i.e., Catalog of Federal Domestic Assistance [CFDA] 84.133 G-4 research or CFDA 84.133 G-5 development) and articles published in peer-reviewed trade journals. The achievements of all the Fellows provide a clear and compelling example that highlights IRCBIM's promise as a framework for building research capacity at minority-serving institutions. It is important to underscore that research mentoring directly or indirectly benefited all parties engaged in the process (i.e., Fellows, mentors, and institutions). For example, Fellows acquired new knowledge and research skills, expanded their social networks, became more aware of research opportunities, increased their confidence in research abilities, and enhanced their career prospects.

A critical aspect of the Academy was the research mentor and the role the mentor played. Qualitative evaluation results revealed that capable mentors facilitated the development of positive mentoring relationships and experiences. Accordingly, the Fellows became more astute not only in

research but also in navigating and negotiating higher education landscape. Unfortunately, many faculty members and administrators lamented the inadequacy of resources dedicated to faculty mentoring. Accordingly, many participants suggested that the mentorship component of the model should be made available to all faculty members across minority-serving institutions. This finding reinforces the need for strategic and innovative methods designed to build a critical mass of researchers of color available to serve as role models and mentors to students and early career investigators affiliated with minority-serving institutions.

The evaluation results also revealed that the community of practice was a vital model component for building research capacity at minority-serving institutions. For example, participants perceived this activity as an innovative intervention for cross-fertilization of knowledge, platform for problem-solving, and networking and support system. In addition, communities of practice provided Fellows an arena where they felt that their research was validated and valued. Communities of practice were also used as an avenue for promoting team science and socializing faculty scholars in other disciplines into the disability and health R&D culture and ethos. The use of electronic collaborative technologies (e.g., emails and teleconferencing) proved very useful as it brought together geographically dispersed Fellows, mentors, and other stakeholders to work towards a common purpose.

Grant writing training is an innovative model component for empowering faculty members to conduct cutting-edge research. Both quantitative and qualitative evaluation results showed that this training had several advantages. For example, the training enhanced grant writing skills and knowledge for participants, increased their confidence to develop grants, and contributed to enhanced scholarship. Additionally, participants singled out the grant writing training as an effective strategy for providing awareness-level information for faculty members, students, and staff about available R&D funding opportunities at NIDILRR and other federal agencies. Grant writing training will continue to be needed at minority-serving institution where, as these results suggest, many faculty scholars may not have earlier advantages (e.g., mentorship and/or role models, opportunities to participate in ongoing research, and publication record of accomplishment) needed to develop successful grants.

Moreover, competitively awarded grants and cooperative agreements drive R&D in the U.S. Within the context of funded research, this means that those who have access to important information, training opportunities, resources, and networks will not only continue to dominate the R&D arena, but also in profound ways influence disability/health and rehabilitation policies and practices. Robert Merton (1968), a prominent sociologist, coined this phenomenon as the "Matthew effect", which postulates that initial advantage leads to further advantage and vice versa. In other words, success is the result of accumulative advantage. Unfortunately, the current system of accrued advantage mostly serves PWI interests. Consequently, minority-serving institutions continue to accumulate disadvantages as a result of institutional, individual, and systems barriers. These accrued disadvantages are clearly linked to their underrepresentation in the federally-sponsored R&D ecosystem.

Like many institutions of higher learning, participants reported that research infrastructures have increasingly become of great strategic significance to minority-serving institutions where research

development and innovation has gained attention and momentum. Overall, our quantitative and qualitative findings indicated that technical assistance and consulting on infrastructure issues such as strategic planning, research assistants/administrative support operations, institutional review board (IRB) efficient operation and function, office of sponsored programs operations, manuscript development, and peer review publication consultation, building SVRA and minority-serving institution partnerships was helpful. Participants, for example, described manuscript development and peer-review publication training and consultation as a timely intervention. They reported that minority-serving institutions are increasingly using an individual's publication record to make tenure and promotion decisions, provide rewards, and to recruit new faculty. Consistent with available literature (Moore, Manyibe, Sanders, et al., 2017; Roederer et al., 2013), participants observed that scholarly publications at these institutions were growingly associated with personal rewards such as academic reputation, recognition from peers, and a sense of fulfillment. Moreover, they felt that frequent publication brought attention and prestige to scholars' departments and institutions.

Our quantitative findings indicated that minority-serving institutions enhanced their research infrastructures as indicated by the decreased need scores between baseline and post-intervention. For example, the need for a research strategic plan decreased between the two phases. This positive change can be attributed to the availability of research strategic plans, which we helped each of the five participating institutions to develop. Qualitative results support this finding but also illuminated implementation challenges. For example, some participants complained that institutions were slow at implementing the strategic plans while others voiced their unawareness of the existence of such plans.

An examination of scores of individual infrastructure elements revealed mixed findings. For example, quantitative findings showed that the need for institutional technological resources, such as computers and research software (e.g., SPSS, SAS, and NVivo), increased between baseline and post-intervention. This finding is notable because it reflects the continued need for assisting minority-serving institutions in building or modernizing their technological research infrastructure and illuminates the existence of the digital divide. We speculate that the increased demand for technology that supports research was, in part, due to a culture of research that has begun to grow at these institutions. As more faculty scholars and students start engaging in research activities, it became clear that available technological resources could not meet increased demands. It is thus critically important that capacity building efforts at minority-serving institutions focus attention on building R&D technological capabilities to both meet increasing demand and ensure the integrity of research processes such as data collection, management, processing, analysis, dissemination, application, sharing, and archiving.

Strategies and Components for Adoption Consideration by NIDILRR and Application to other Minority-Serving Institutions

Strengthening research capacity building at minority-serving institutions calls for a comprehensive approach that leads to all-inclusive capability. Our findings and experiences demonstrate that individual interventions (e.g., formal mentorship), however vital, are not enough on their own to meet the many complex and interrelated challenges to research capacity building and research

infrastructure development at these institutions. The seven IRCBIM intervention components provide a framework for a comprehensive approach. Accordingly, NIDILRR and other federal agencies (e.g., NIDILRR, NIH, and AHRQ) whose role is to promote disability/health and rehabilitation research and create a diversified scientific workforce should consider adopting all IRCBIM intervention components for implementation (i.e., Moore, Manyibe, Aref, et al., 2017). In making this suggestion, we do not assume that the intervention components are well established for mapping across all institutions. On the contrary, the IRCBIM intervention components should be contextualized to address the unique needs of each institution. A comprehensive approach should address three areas:

- Institutional research infrastructure (e.g., facilities, strategic planning, technology, databases, administrative support, and facilities).
- Individual research skills development (e.g., methodological and grant writing skills).
- Contextual system issues that explicitly or implicitly influence research capability at minority-serving institutions (e.g., participation as grant expert panel reviewer and proposal reviewer training and processes that inform funding priorities).

Implementing comprehensive research capacity building strategies may not be feasible in some situations due to scarce financial and human capital. In such circumstances, it would be prudent to implement one or a combination of the model intervention components. For example, the Academy can be implemented as a "standalone" intervention, especially when resources to implement universe components of the IRCBIM are limited. In our previous work (Manyibe et al., 2015; Moore, Manyibe, Aref, et al., 2017), we discussed in detail the design of the Academy (i.e., Peer-to-Peer Research Team Mode), which emphasizes vital capacity building elements such as ongoing research, teamwork, collective learning, participation in the community of practice, embedded leadership development opportunities, cultural competency skills development, incentive schemes, and peer support. In making decisions about model intervention components to adopt, institutions and/or funding agencies should consider which outcomes are of highest priority. We recommend the establishment of an inclusive task force or committee at the institutional level. The task force must conduct a research capacity building, and research infrastructures need assessment to inform the implementation, monitoring, and evaluation of the intervention component(s) selected for adoption.

Experiences of the Fellows and mentors. Overall, the results indicated that Fellows and mentors had a positive mentoring experience. For instance, they indicated that mentoring was very rewarding and felt "a sense of accomplishment," both intangible and intangible terms. Consistent with previous studies (e.g., Worthington et al., 2016), participants (i.e., Fellows, mentors, and administrators) identified several aspects of the model that made the mentorship experience successful. Such elements included experienced and capable mentors, research teams, clear goals and objectives, accessibility of mentors, organization, and delineating roles and responsibilities. Additionally, Fellows reported that they felt supported, motivated, and received clear directions and guidance on professional issues. Participants also underscored the importance of establishing rapport, building trust, providing a supportive environment, and resources as vital ingredients in the mentoring process. This finding is consistent with

previous research (e.g., Worthington et al., 2016) indicating that positive mentorship experiences are a result of an interplay of many factors related to the behaviors and actions of mentors and Fellows as well as program design aspects.

These findings also shed light on the importance of having capable multiple mentors in nurturing early-career investigators. Given that Fellows usually have many needs, it may not be possible to have one mentor who "knows it all" and can offer focused and tailored guidance. There is a growing body of evidence that underscores the importance of junior and senior investigators having multiple mentors (Johnson, 2013; Sternberg, 2013) to assist them adapt to the constantly changing research environment characterized by team science, diverse human capital, new technology, globalization, and fluid career expectations. Investigators, especially those affiliated with minority-serving institutions, need multiple mentors who can provide them with different skills and knowledge at various stages during their careers. Sternberg (2013) argues that relying on one mentor is self-sabotage in the academic career. Having multiple mentors, however, can have its own pitfalls. For example, interview findings showed that having many mentors sometimes caused role confusion. Based on our findings, we recommend that each research team should have between three and four mentors. In addition, matching mentors with mentees must be done carefully.

Mentorship Advantages and Challenges

Table 18 shows some of the benefits associated with the Academy as perceived by Fellows and mentors. Our quantitative and qualitative results pointed to multiple challenges or obstacles to Fellows conducting research such as scheduling difficulties, providing protected time (release time), staff turnover, and the limited capacity of institutions. Evaluating multifaceted change efforts, such as research capacity building at minority-serving institutions, can be a challenging undertaking.

TABLE 18. Benefits of Mentorship to the Institution, Fellows, Mentors, and the Field

Institution	Mentor	Mentee/Fellow
Improves the institution's research infrastructure and systems Enhances institution's research culture Improves institution's communication Use for tenure and promotion Helps advance mission of the institution Improved retention of quality faculty scholars and staff Improves quality of education Improves student retention and graduation rates Improves collaboration and networking. Improves institution's research culture Facilitates research leadership development	Develops up-to-date research skills and professional knowledge Offers networking opportunities Improves leadership skills Improves interpersonal communication skills Raises profile within the Peer-to-Peer Mentor Research Team Academy Increases job satisfaction Offers opportunity to pass on knowledge and experience	Research skills and knowledge development Networking with seasoned research actors and peers Develops own practice Develops research self-confidence Develops ability to accept and utilize feedback Increases opportunity for tenure and promotion Facilitates research leadership Encourages inter-professional learning Improves commitment to the field Develops professional identity Offers social and psychological support Develops Prestige among peers and within the Peer-to-Peer Mentor Research Team Academy

To address mentorship challenges at the individual level, participants identified building a critical mass of researchers and mentors at minority-serving institutions and investing in human capital (e.g., office of sponsored programs and IRB staff) that facilitate research. Other strategies include providing incentives such as release time for faculty members to conduct research, being flexibility, addressing issues early (e.g., scheduling conflicts), planning meetings, and effective communication. These strategies could help facilitate effective mentorship efforts. As our results reveal, some minority-serving institutions are slowly but steadily transitioning from teaching to research institutions. Therefore, mentorship strategies should also include a focus on developing grit among faculty members and students at these institutions.

The usefulness of including IRCBIM strategies and methodologies in training early-career investigators involved in research with people of color with disabilities.

Strategies designed to strengthen or build disability and rehabilitation research infrastructures at minority-serving institutions should involve training of early-career investigators at these institutions. As already discussed, IRCBIM uses a whole system perspective, which involves taking into account different research production and innovation aspects of minority-serving institutions in the context of their unique environment. One of the important aspects of this approach is that the training of Fellows considers the history of the institutions and communities they serve. Understanding the historical context of HBCUs, HSIs, TCUs, and other minority-serving institutions would provide deep insight into the intersectionality of race and ethnicity, U.S. higher education landscape, and current R&D challenges they face. It would also help better understand how to holistically address disability/health and rehabilitation disparities. Conversely, adopting a narrow capacity building approach to a complex, multi-layered historical problem may lead to ineffective interventions that perpetuate stereotypes that have long located the problem within minority-serving institutions. Moreover, although some of the old paradigm capacity building approaches may generate positive outcomes, they have not been capable of bringing about the urgently needed transformative research cultural change at these institutions.

Some scholars (Manyibe, Sanders, Aref, et al., 2017; Moore, Manyibe, Sanders, et al., 2017) attribute the current low research capabilities at many minority-serving institutions to the old paradigm, which unfortunately concentrates research resources at PWIs. IRCBIM, on the other hand, was designed to cultivate an institutional culture that supports the pipeline infrastructure for developing the research talent and producing future research leaders. These institutions, which are seeking to become high research activity (see Carnegie basic classification of institutions of higher learning), must have well-functioning research infrastructures such as office of sponsored programs, competent IRBs, adequate physical facilities, research assistants, libraries, and data-oriented infrastructures for management, storage, and archiving of data sets.

Our findings indicate that the technical assistance and consulting that was provided resulted in the development of customized strategic plans that provide a framework to guide research capacity building at the institutions. More specifically, the plans contained a mission statement, research goal, objectives, resources, and management plan. The plan further provided minority-serving institution leaders (e.g., presidents), administrators, investigators, and research funding agencies the opportunity

to align research activities and objectives with the needs of the local community. The model envisions technical assistance and consulting as an ongoing capacity building activity to ensure that the institution keeps abreast of policy shifts, technological advancements, and socioeconomic transformations, among others.

The results also revealed that there exists substantial unmet research capacity building and infrastructure improvement needs at minority-serving institutions. Quantitative findings indicating slight changes in numerous research capacity and infrastructures improvement domains between baseline and post-implementation lead us to make two conclusions. First, substantial financial resources are needed to address several unmet capacity building needs. For example, there is a need to increase mentorship opportunities to build a critical mass of researchers at these institutions. Second, it is vital to continue building critical research infrastructures that support team science at minority-serving institutions.

Collectively, IRCBIM intervention components contributed to the further development of a culture of research at participating institutions. According to Hanover Research (2014), "a culture of research provides a supportive context in which research is uniformly expected, discussed, produced, and valued" (p. 5). As our quantitative and qualitative findings indicate, participating institutions not only increasingly valued research but also encouraged and incentivized faculty members to produce scientific products (e.g., peer-reviewed articles) and disseminate their findings. For example, information collected from Fellows, administrators/staff, and mentors in interviews, focus groups, and document reviews revealed that some institutions provided monetary support to faculty who were pursuing doctoral or master's degrees in their fields as a strategy to foster a research culture at their institutions. Moreover, findings also indicated that universities and colleges were increasingly using research productivity in making tenure and promotion decisions. This finding highlights a paradigm shift within minority-serving institutions – from a focus on solely teaching and community service to a broader focus that embraces education, research, and innovation as core to their institutional mission.

Key Recommendations

We have developed several recommendations intended to provide guidance for scaling-up future research capacity building model evaluations and enhancing comprehensive scientific abilities and performance at minority-serving institutions. The following suggestions are presented for NIDILRR, NIH, other federal research agencies, minority-serving institution leaders and faculty scholars, research capacity building scholars, and mentors to consider as potential response strategies. We believe that IRCBIM provides a practical and realistic starting point for building and strengthening these under-resourced institutions' disability/health and rehabilitation research ecosystem.

Recommendation #1: NIDILRR should develop additional funding streams targeting minority-serving institutions where IRCBIM field-test replications can be carried out, thereby exponentially extending the model's capacity building benefits to other minority-serving institutions. Mentorship should be included as a priority for this funding investment. The agency's Disability Rehabilitation Research Projects [DRRP], Rehabilitation Engineering Research Centers [RERC], and Spinal Cord Injury Model Systems mechanisms could be targeted as test hosts for IRCBIM's Academy feature adoption. In particular, a

NIDILRR priority establishing an RERC on an HBCU campus with an engineering academic program would build their R&D capacity and help to increase the number of well-trained scientists and engineers of color available to develop needed AT innovations.

Recommendation #2: Capacity building researchers should scale-up future field-tests longitudinally to identify which IRCBIM features are more effective over time for building disability/health and rehabilitation research capacity at minority-serving institutions. In light of the disproportionate corona virus (COVID-19) infection rates among people of color, researchers could assess the efficacy of mentoring strategies and models that facilitate early-career investigators' participation in COVID-19 research focused on persons of color with disabilities across employment, community participation, and health and function outcome domains.

Recommendation #3: Researchers should continually update their cultural competency knowledge to ensure they design and implement culturally appropriate capacity building interventions at minority-serving institutions. These institutions are complex ecosystems that require interventions that consider the collective individuals as well as the inanimate unique cultural contextual aspects such as their missions, histories, traditions, and geographical locations.

Recommendation #4: Minority-serving institution leaders should support the development of formal mentorship programs on their campuses that nurture, support, and develop the research talent. A "talented tenth" approach (Du Bois, 1903; Ellis, 2011) whereby the most capable early-career faculty scholars could be encouraged to work with seasoned researchers within as well as across-universities to further develop their research skill sets (e.g., methodology and grantsmanship). Administrators might consider leveraging available resources by having these faculty scholars participate in current federally-funded initiatives that mentor and/or train the talent such as the LU-RRTC, and others.

Recommendation #5: Minority-serving institution leaders should offer incentives to tenured and tenure-track faculty scholars designed to encourage them to pursue and obtain extramural grant funding, contribute to the development and sustainability of a culture that values R&D and scientific productivity, and attracts and retains the talent. We recommend a mixture of monetary (e.g., salary raises, travel funding, paid research assistants) and non-monetary incentives (e.g., reducing teaching load, providing adequate office space, and providing additional credit or value toward tenure and promotion).

Recommendation #6: Minority-serving institution administrators should develop and implement new policies that encourage innovative practices designed to stimulate scientific productivity among faculty members. The goal would be to create a new research synergy through such initiatives within the institution's culture; achieving the buy-in from both the academic and research divisions/departments to achieve strategic research production goals (e.g., amount of grants funded on campus, number of refereed journal articles published by faculty).

Recommendation #7: Minority-serving institution leaders should provide protected time to faculty members interested in conducting rigorous R&D activities. As a practical matter, administrators might consider prioritizing faculty scholars based on momentum and positioning; selecting those with the greatest promise in research grants procurement and refereed journal publications to benefit first from time protection initiatives.

Recommendation #8: Minority-serving institutions in partnership with NIDILRR and other federal research agencies (i.e., NIH, Agency for Healthcare Research and Quality [AHRQ], and National Science Foundation [NSF]) should facilitate a reward mechanism for early-career investigators or new faculty members at minority-serving institutions to incentivize their full engagement early in robust, rigorous disability/health and rehabilitation research.

Recommendation #9: Researchers should conduct studies that examine federally-sponsored research centers based at minority-serving institutions to highlight their positive impacts and challenges they face in advancing the minority disability/rehabilitation and health science literature.

Recommendation #10: Faculty members should exhibit research leadership and advocate for reduced teaching loads and student advising and administrative responsibilities to enable them to devote adequate time to research and research skill building activities such as mentorship, grant writing, and manuscript development trainings. This is especially critical for early-career investigators, who aspire to become research leaders.

Recommendation #11: Faculty members should learn and implement innovative strategies that help them achieve greater balance between research, teaching (especially redundancy of topics), service, administrative, and family responsibilities.

Recommendation #12: Faculty members should participate in Communities of Practice that focus on learning and exchanging information and knowledge related to innovative approaches to improving disability/health and rehabilitation outcomes and experiences among individuals with disabilities from minority racial and ethnic backgrounds. Faculty members can help lead these communities in learning innovative ways of integrating research processes into the culture of communities of color and minority serving institutions.

Recommendation #13: Faculty members should avoid working in silos and instead work collaboratively on research projects such as grant writing and manuscript development because such team-based opportunities augment the development of research leadership competencies.

Recommendation #14: Research mentorship programs should provide substantial opportunities for mentees to develop their leadership skills such as leading multidisciplinary research teams and participating in grant management meetings.

Recommendation #15: NIDILRR, NIH and other public and private research funding agencies should develop and implement mechanisms for including representatives from minority-serving institutions on boards, taskforces, and providing them with other opportunities for research leadership development.

Recommendation #16: NIDILRR should provide a funding supplement to the "National Flagship LU-RRTC" that has expertise and a proven track record in successfully carrying out activities (i.e., methodology and grant-writing skills) aimed at enhancing faculty scholars' research skills through methodology and grant writing training. This funding supplement could facilitate a massive expansion in the Center's mentoring and training agenda targeting these members of the professoriate, including academicians with disabilities who are also people of color.

Recommendation #17: NIDILRR should fund return-on-investment studies to generate empirical data-driven results that shed light on the economic advantages of research capacity building investments at minority-serving institutions important to policy makers and taxpayers. The economic impacts of federal research funding, or the lack thereof, on these under-resourced institutions and surrounding economically marginalized communities of color are relatively unknown.

Recommendation #18: Researchers should conduct longitudinal studies to determine the nature and importance of collaborations and networks that position junior-level faculty scholars and early-career investigators to become future disability/health and rehabilitation research leaders of color in the field.

Recommendation #19: Researchers should investigate the intersectionality of research capacity building interest/inclination and faculty scholars' gender at minority-serving institutions. We believe that these types of empirical studies (i.e., inquiries that examine specific cultural dimensions and the role they play in interest/inclination toward minority research capacity building) would enrich the existing body of knowledge and help to inform practices, policies, and R&D.

Recommendation #20: Faculty members at minority-serving institutions should seek out and participate in formal research mentorship programs (e.g., Academy) to build their research skills (i.e., research methodology and grant writing) and knowledge.

Recommendation #21: Faculty members should actively participate in research skill and professional development trainings within and external to their campuses. For example, the LU-RRTC periodically offers grant writing, manuscript development, and research methods webinars and trainings open to minority-serving institution faculty scholars and students.

Recommendation #22: Minority-serving institutional leadership should encourage faculty scholars to mentor undergraduate and graduate students by including them in ongoing research projects. A growing body of evidence shows that involving students at these institutions in research early is a strategy for building the pipeline for creating a diversified scientific workforce.

Recommendation #23: NIDILRR and other research funders should support additional studies at the exploration stage-of-research that examine new and emerging research mentorship approaches at minority-serving institutions to help generate hypotheses about what works and merits confirmation in more complex studies (e.g., well-matched comparison-group studies).

Recommendation #24: Researchers should continue field-testing the Academy mentoring model to assess and identify features that are more beneficial for building the capacity of faculty members based at minority-serving institutions to conduct rigorous scientific studies.

Recommendation #25: Minority-serving institutions should develop and implement incentives that attract and retain research leaders to their campuses to serve as mentors and role models. Such leaders, based on a mutually agreed structure, should be required to dedicate a percentage of their time to mentor early-career investigators.

Recommendation #26: Minority-serving institution leaders should develop and implement an "Innovative Undergraduate Research Mentoring by a Faculty Award". This award would recognize excellence in undergraduate research mentoring by a faculty member. Implementing this award will

signal that the leadership is committed to improving the R&D enterprise within the context of their campuses and is committed to commencing that pipeline early on among undergraduate students.

Recommendation #27: NIDILRR and other federal funding agencies, in collaboration with leaders at minority-serving institutions, should invest in technological resources that drive the R&D enterprise to help meet the increasing demand for these assets.

Recommendation #28: NIDILRR, NIH and other federal agencies should commission a joint feasibility study on establishing a national research infrastructure development investment fund targeting minority-serving institutions. The study should generate recommendations on innovative ways to implement comprehensive strategic plans designed to provide a roadmap for creating missing R&D support systems at these institutions as well as strengthen and update existing ones.

Recommendation #29: NIDILRR and other federal agencies should commission longitudinal studies that examine IRCBIM's individual, institutional, and systems levels impacts. These inquiries are needed to provide empirical information critical to increasing the field's understanding of the model's long-term benefits. They could provide insight about culture shifts at minority-serving institutions as well as emerging institutional capacity-building and individual research skill enhancement needs.

Recommendation #30: Minority-serving institution leaders should put in place mechanisms for managing the processes by which they recruit, develop, and retain research administrative units' (i.e., office of sponsored programs) human capital.

Recommendation #31: Minority-serving institution leaders should work in partnership with federal agencies that fund disability/health and rehabilitation research (e.g., NIDILRR, NIH) to identify fiscal mechanisms that support the professional development of institutional research administrators, leaders, and staff.

Recommendation #32: Emerging capacity building models should include a focus on developing human capital (i.e., the talents and competencies) responsible for ensuring the effective functioning of research administrative units such as the office of sponsored programs, institutional review boards, and the office of comptroller, which directly influences R&D outcomes at academic institutions.

Recommendation #33: Researchers should conduct studies that develop a profile of disability/health and rehabilitation research centers at minority-serving institutions, detailing annual flow of R&D funds from each federal agency. This information could make it possible to evaluate the impact of Presidential Executive Orders (e.g., Presidential Executive Order 13779- an initiative to promote excellence and innovation at HBCUs [Trump, 2017]), which require federal agencies to prepare annual plans describing efforts to strengthen the capacity and competitiveness of minority-serving institutions.

Recommendation #34: NIDILRR, NIH and other federal agencies should intentionally fund a critical mass of grant applicants with merit (i.e., fundable scores) from minority-serving institutions, especially those institutions that have been historically underrepresented across the federal funding landscape, as a demonstration that they value the power of diversity.

Recommendation #35: Minority-serving institution leaders should develop and implement institutional research policies that support and promote research culture. To actualize a research vision, these institu-

tions must develop and implement long-range strategic plans that clearly align with their mission, goals, objectives, and resources along with R&D expectations.

Recommendation #36: Minority-serving institution leaders should invest in ongoing R&D (i.e., activities designed to advance and sustain research capabilities) to provide opportunities for early-career faculty members and students to develop their research while simultaneously making meaningful contributions to the disability/health and rehabilitation scientific literature.

Recommendation #37: Minority-serving institution leaders should financially support faculty scholars at their respective institutions, especially TCUs, who are pursuing graduate degrees. For example, institutional leaders and funding agencies can explore ways to provide financial support to faculty at TCUs (e.g., programs where faculty advanced degree educational costs are subsidized by the institution in exchange for payback in the form of time worked at the institution post-degree) who are pursuing graduate degrees in disability/health and rehabilitation programs.

Recommendation #38: Minority-serving institution leaders should work with their respective communities and their disability leaders and advocates to develop trusting relationships and partnerships, which are critical not only to research participant recruitment, but also to empowering communities of color as co-researchers.

Recommendation #39: Faculty scholars should seek and establish relationships with multiple seasoned mentors (e.g., comprised of content experts, multicultural specialists, methodologists, and statisticians) who can help guide their research agendas and support them at various stages during their development as researchers.

Recommendation #40: Research should consider examining relationships between mentees/Fellows and mentors and describe their experiences, especially as it relates to research skill development and success in developing peer-reviewed articles and procuring federal grants to undertake rigorous R&D projects.

Recommendation #41: Research should examine and identify the ideal philosophical orientation toward the mentoring process that is idyllic for mentees who are members of underserved and minority groups. For example, mentors that embrace the philosophy to prepare mentees who can surpass the mentors' achievements are probably best suited for working with protégés at minority-serving institutions.

Recommendation #42: Researchers should investigate long-term impacts of formal mentoring relationships. Such studies might examine whether mentorship experiences influence Fellows' (mentees) decisions to seek full-time faculty positions at minority-serving institutions. They could also examine whether Fellows continue to conduct research that focus on persons of color with disabilities across their career paths.

Recommendation #43: NIDILRR and other federal agencies should conceptualize minority-serving institutions as strategically positioned to serve as avenues for diversifying the scientific workforce. To enhance intramural agency capacity to more effectively serve marginalized racial and ethnic disability populations across the nation, NIDILRR should strongly consider developing an internal Fellowship Program in partnership with HBCUs that promotes diversity within the agency's project officer and

leadership cadre; ensuring that the voices of those who are often overlooked are heard around the decision-making table.

Recommendation #44: NIDILRR and other federal agencies should consider increasing their investments in early intervention strategies designed to stimulate interest in disability/health and rehabilitation research and scientific careers among minority students, including those with disabilities, at the primary, secondary (middle and high school) and undergraduate college levels. Because research is a learned behavior, which can begin as early as elementary school and enhances as individual's progress through the academic and professional ladder, these agencies should work in partnership with minority-serving institutions to develop and implement such interventions. The McNair Scholars Program, which is designed to socialize minority students into disability and health research careers before college or graduate study, could serve as a potential model, among others.

Recommendation #45: Institutional leaders should consider developing and implementing new disability/health and rehabilitation graduate level academic programs that will help to prepare the next generation of minority disability researchers and capacity building experts.

Recommendation #46: NIDILRR, NIH and other federal research funding agencies should commission a study to determine short and long-term scientific workforce diversity needs and make recommendations on ways to collaborate with minority-serving institutions as partners for implementation.

Recommendation #47: NIDILRR and other federal agencies should create additional opportunities for faculty scholars, students, and staff affiliated with minority-serving institutions to establish networks with successful researchers, federal agency personnel, and other stakeholders who drive the R&D enterprise. Because the position one occupies in a social network plays a critical role in shaping behaviors, these agencies should make *intentional efforts* to ensure that faculty members, students, and staff at these institutions are not only connected—but more importantly that they occupy central positions that allow them to influence decisions.

Recommendation #48: Minority-serving institutions should establish and cultivate close research collaborations with disability organizations such as the National Coalition of Disability, National Center for Disabilities, and others to address new and emerging issues worthy of scientific examination. The role of researchers at minority-serving institutions in such collaborations warrants clarification and updating to address the emerging needs of a diverse society.

Recommendation #49: NIDILRR in partnership with minority-serving institution faculty scholars, students and staff, and other research funders (public and private) should develop, finance, and sustain a research capacity building and infrastructure development collaborative network to establish connections and information exchanges relevant to the context (e.g., cultural, policy, and needs) where these institutions operate.

Recommendation #50: Minority-serving institution mid-management administrators (e.g., departmental heads and program chairs) should work with faculty scholars to develop a climate within their units that fosters a culture of collegiality.

Recommendation #51: NIDILRR, NIH and other federal agency leaders should sponsor project officers' travel to minority-serving institution campuses to raise faculty scholars' and researchers' awareness of the need for reviewers as well as provide them information about competitive R&D grant mechanisms and related opportunities.

Recommendation #52: NIDILRR, NIH and other federal agency leaders should develop a comprehensive recruitment outreach plan to increase minority-serving institution investigators' participation on grant review panels, and to ensure that an appropriate representation of minority expert researchers participates on these panels. Methods of effective outreach to these institutions should be established with substantial input from key stakeholders (e.g., HBCU researchers, faculty members, and administrators).

Recommendation #53: NIDILRR should develop a paid "Minority-Serving Institution Fellows Program" for undergraduate, master's, or doctoral level students, including those with disabilities, matriculating at HBCUs, HSIs, or TCUs interested in, and committed to developing careers in federal agencies with disability/health and/or rehabilitation foci. Under this program, Fellows should have the opportunity to work directly with NIDILRR senior staff, participate in NIDILRR network groups, get hands-on experience in grant-making processes through participation on a variety of essential assignments, and receive career mentorship. This program will contribute to NIDILRR's workforce diversity enhancement efforts.

Recommendation #54: Mentors and mentees should work collaboratively to schedule meeting times in advance. In addition, the agenda, goals, and expectations for each meeting should be clear and shared in advance to ensure that all parties involved are prepared.

Recommendation #55: Mentors should use different meeting modalities such as face-to-face and teleconferencing to ensure greater flexibility and to accommodate the needs of participants. The use of technological software programs such as Zoom, GoToMeeting, Basecamp, Asana, and Tegrity can facilitate information sharing, manage projects, and enhance productivity.

Recommendation #56: Mentors should develop their cultural competency skills. Mentees at minority-serving institutions represent individuals from diverse cultural backgrounds. These relationships will require generous capable mentorship whereby mentees are provided with culturally appropriate guidance and support in developing their research agendas. Mentors should consider contextual factors when working with these mentees such as family structures and obligations, traditions, religion, countries of origin norms, etc. These elements should be considered and learned about to develop a relationship of cultural reciprocity- where each mentor and mentee can learn from one another in how best to facilitate an excellent mentorship experience.

Recommendation #57: Mentors should make an intentional effort to provide a comprehensive learning support system that facilitates successful mentoring relationships. These supports may be cognitive (e.g., identifying research ideas), emotional (e.g., motivating and inspiring), social (e.g., providing advice on how to interact with research team members) or physical (e.g., providing research articles).

Recommendation #58: NIDILRR, NIH and other federal funding agencies should develop mechanisms that encourage the selection of grant reviewers from minority-serving institutions. Such actions could address perceptions that the grant review process favors predominantly White institutions (PWIs). One implication of Hoppe et al.'s (2019) finding on proposal topic importance (i.e., population focus versus microscopic focus) in explaining NIH R01 grant award racial discrepancies is the need for a diverse scientific reviewer pool. In order to address bias against disparity research as a topic, there is a dire need to bring minority researchers' perspectives on the significance of addressing rehabilitation and health inequity issues in the proposal assessment process.

Recommendation #59: NIDILRR, NIH and other federal funding agencies should conduct bi-annual evaluations designed to address underlying biases within the selection of grant expert/peer-reviewers from minority-serving institutions. Evaluation findings should be made available to the public to help create a culture of accountability as well as to make it possible to develop data-based interventions to address any identified biases.

Recommendation #60: NIDILRR and NIH leaders should increase the level of transparency of the grant peer-review process by publicly disclosing minority-serving institution faculty and racial/ethnic composite demographic data for review panels across specific competitions. This practice would ensure that faculty members at minority-serving institutions play an active role in the scientific peer review process.

Recommendation #61: NIDILRR, NIH, and other federal agencies should address their expectations for minority-serving institutions' proposal success. This is especially critical given that participants felt that the R&D community tends to devalue scientific knowledge generated at minority-serving institutions. Devaluing knowledge generated at minority-serving institutions can have several far-reaching negative psychological consequences at the individual and collective levels, which in turn may discourage individuals at these institutions from conducting meaningful research.

Recommendation #62: NIDILRR and other federal agencies should fund the establishment of new undergraduate, masters, and doctoral (i.e., Ph.D.) level health and rehabilitation training programs at minority-serving institutions as part of its capacity building long-range strategy. These additional academic programs would help to build the training pipeline infrastructure and contribute to the diversification of the scientific workforce.

Recommendation #63: NIDILRR, as a key implementing agency of Section 21, should designate a significantly higher proportion of its annual budget exceeding the currently mandated 1% to minority-serving institution capacity building efforts. This action could help to ensure that a critical mass of these entities is developed to participate in R&D activities. NIDILRR is well-positioned to become a role model for other federal agencies on how to develop and sustain a stream of targeted research capacity building priorities implemented by minority-serving institutions as grantees.

Recommendation #64: NIDILRR should plant and subsequently cross-fertilize through funding new or sustained projects that grow out of the following mechanisms on the campuses of HBCUs and other minority-serving institutions: Advanced Rehabilitation Research Training [ARRT], Disability Rehabili-

tation Research Projects [DRRP], Field Initiated Projects [FIP], Rehabilitation Engineering Research Centers [RERC], Rehabilitation Research and Training Centers [RRTCs], Small Business Innovation Research [SBIR], and the Switzer Research Fellowship Program.

Recommendation #65: The U.S. Congress should amend the 1973 Rehabilitation Act (Section 21 Mandate enacted in 1992) to significantly increase NIDILRR's required annual budget designation of only 1% to minority-serving institutions to 15%. In light of the devastating effects of pandemics such as COVID-19 on people of color and disproportionate rate of disability and incidence of pre-existing health conditions (i.e., diabetes, heart disease, high blood pressure) due to social determinants of health, the agency should be mandated to devote a significantly higher proportion of its funding to position these institutions to become rapid R&D responders to future crises. To offset potential budget hardships on the agency, the Congress should increase overall funding to NIDILRR through subsequent annual budget appropriations. Influential disability associations, advocates and networks, and Congressional leaders on the Republican and Democratic sides could work together as "Champions" for this Section 21 mandate amendment.

Recommendation #66: NIDILRR, NIH and other federal agencies (e.g., NSF) should consider establishing a National Research Infrastructure Fund targeting minority-serving institutions. The fund would focus on strengthening research ecosystems at these institutions. The establishment would not only align with Presidential Executive Orders that have consistently sought to promote excellence and innovation at minority-serving institutions, but would also be congruent with national scientific, educational, security, and socioeconomic development policy goals and objectives.

Recommendation #67: NIDILRR should develop a new "racial equity" outcome domain. This novel area would promote improved outcomes among people of color with disabilities that cut across the agency's current three inter-related domains of employment, health and function, and community living and participation. As a component of this, NIDILRR would fund translational research to (a) alleviate unequal rehabilitation and health experiences and outcomes among members of this target population and (b) build the capacity of HBCUs and other minority-serving institutions to participate in R&D. Research and capacity building activities would support the goal of mitigating R&D funding disparities between these under-resourced institutions and PWIs.

Conclusion

The findings support IRCBIM as a promising research capacity building and infrastructure approach. Adoption of the model could empower minority-serving institutions to play a more critical role in improving disability/health and rehabilitation research methodology as well as systems serving persons of color with disabilities across employment, health and function, and community living and participation outcome domains. Successful implementation, however, will require sustained efforts, coupled with synergistic long-term federal research agency (e.g., NIDILRR, NIH) sponsorship. Accordingly, multi-level capacity building and research infrastructure development strategies are needed to ensure that these institutions fully contribute to generating new knowledge that can translate

into solutions to disparate service experiences. We understand that IRCBIM, like other new models, might not represent a complete generalization of the reality at minority-serving institutions. Certainly, most emerging conceptual frameworks guiding these novel approaches must undergo several revisions to accommodate new data, information, and developments, or respond to current research capacity building realities. Future scaled-up evaluations will help ensure that the model continues to reflect current knowledge, practices, and societal transformations. Additionally, efficacy-scaling through rigorous scientific methods will make new contributions to the research capacity building science in the form of new and revised paradigms that address the institutional infrastructure challenges, research skill development needs, institutional research infrastructure weaknesses, and federal research agency systems and policy issues. This type of longitudinally scaled testing will of course require a sustained national priority status coupled with supportive long-range federal agency (e.g., NIDILRR and NIH) community-informed strategic plans (i.e., upcoming NIDILRR 2024-2029 Long-Range Plan), and networks with communities of color, disability/health and rehabilitation associations and foundations, and disability leaders and advocates.

The results point to the need for NIDILRR, NIH and other federal agencies to make greater financial investments into further developing these under-resourced institutions' ability to help realize their vision of becoming more research intensive. Indeed, building adequate research capacity and support infrastructures as well as creating a critical mass of well-trained investigators at these institutions will likely take decades requiring a mix of short-term and long-range strategies and sustained commitments directed at building capacity at the individual, institutional, and systems levels. At the institutional level, minority-serving institution leaders must continue to identify and implement innovative strategies and initiatives designed to maintain the resilience of available systems that support R&D (e.g., office of sponsored programs, institutional review boards [IRBs], comptroller offices). Finally this study was carried out at the intervention development stage-of-research to assess the model's feasibility, and so our results only suggest that IRCBIM impacted the evaluation outcomes. We did not have control over all variables and elements that were also changing at the same time as the model was being evaluated. Therefore, changes in research capacity building and infrastructure development measures and perspectives during the study period cannot fully be attributed to the model. Nevertheless, quantitative and qualitative results strongly suggest that IRCBIM has potential for increasing R&D performance and productivity.

References

America, R. F. (2012). Can HBCUs compete? *The Journal of Blacks in Higher Education.* http://www.jbhe.com/2012/10/can-hbcus-compete/.

American Indian Higher Education Consortium (1999). Tribal Colleges an Introduction. American Indian Higher Education Consortium. http://www.aihec.org/who-we-serve/docs/TCU_intro.pdf

Anderson, M. (2015). Statistical portrait of the US Black immigrant population. *Pew Research Center*. https://www.pewsocialtrends.org/2015/04/09/chapter-1-statistical-portrait-of-the-u-s-Black-immigrant-population/

Arai, K., Cech, T., Chameau, J., Horn, P., Mattai, I., Potocnik, J., & Wiley J. (2007). The future of research universities: Is the model of research-intensive universities still valid at the beginning of the twenty-first century? *European Molecular Biology Organization (EMBO) Reports, 8*(9), 804–810. https://doi.org/10.1038/sj.embor.7401052

Aref, F. (2009). Dimensions of community capacity building: A review of its implications in tourism development. *Journal of American Science, 5*(8), 74-82.

Aref, F., Manyibe, E. O., Washington, A. L., Johnson, J., Davis, D., Eugene-Cross, K., & Moore, C. A. (2017). Research productivity in rehabilitation, disability, and allied health programs: A focus group perspective on minority-serving institutions. *Journal of Rehabilitation Research, Policy, and Education, 31*(3), 194–207. https://doi.org10.1891/2168-6653.31.3.194.

Arroyo, A. T., & Gasman, M. (2014). An HBCU-based educational approach for Black college student success: Toward a framework with implications for all institutions. *American Journal of Education*, *121*(1), 57-85.

Atkins, B. J., & Wright, G. N. (1980). Vocational rehabilitation of Blacks. The statement. *Journal of rehabilitation*, *46*(2), 40-49.

Auranen, O., & Nieminen, M. (2010). University research funding and publication performance—An international comparison. *Research Policy, 39*(6), 822-834. doi: http://dx.doi.org/10.1016/j.respol.2010.03.003

Beech, B. M., Calles-Escandon, J., Hairston, K. G., Langdon, S. E., Latham-Sadler, B. A., & Bell, R. A. (2013). Mentoring programs for underrepresented minority faculty in academic medical centers: a systematic review of the literature. *Academic Medicine, 88*(4), 541–549. https://doi.org/10.1097/ACM.0b013e31828589e3

Bernal, G., & Ortiz-Torres, B. (2009). Barriers to research and capacity building at Hispanic-serving institutions: The case of HIV/AIDS research at the University of Puerto Rico. *American Journal of Public Health, 99*(S1), S60-S65. https://doi.org/10.2105/AJPH.2007.121731

Bezyak, J. L., Ditchman, J. B., & Chan, F. (2013). Communities of practice: A knowledge translation tool for rehabilitation professionals. *Rehabilitation Research, Policy, and Education, 27*(2), 89-103. https://doi.org/10.1891/2168-6653.27.2.89.

Blood, E. A., Ullrich, N. J., Hirshfeld-Becker, D. R., Seely, E. W., Connelly, M. T., Warfield, C. A., & Emans, S. J. (2012). Academic women faculty: are they finding the mentoring they need? *Journal of Women's Health*, *21*(11), 1201-1208.

Bourke, B. (2014). Positionality: Reflecting on the Research Process. *The Qualitative Report*, *19*(33), 1-9. https://nsuworks.nova.edu/tqr/vol19/iss33/3/

Bracey, E. N. (2017). The Significance of Historically Black Colleges and Universities (HBCUs) in the 21st Century: Will Such Institutions of Higher Learning Survive? *American Journal of Economics and Sociology*, *76*(3), 670-696.

Braun, K. L., Browne, C. V., Kaʻopua, L. S., Kim, B. J., & Mokuau, N. (2013). Research on Indigenous elders: From positivistic to decolonizing methodologies. *The Gerontologist, 54*(1), 117-126. https://doi.org/10.1093/geront/gnt067

Brayboy, B. M. J., Fann, A. J., Castagno, A. E., & Solyom, J. A. (2012). Postsecondary education for American Indian and Alaska Natives: Higher education for nation building and self-determination. *ASHE Higher Education Report, 37*(5), 1-154. https://doi.org/10.1002/aehe.3705.

Bull, C. C., Lindquist, C., & Gipp, D. M. (2015). An act of sovereignty: Governing tribal higher education. *Tribal College, 26*(4), 18.

Carrigan, C., Quinn, K., & Riskin, E. A. (2011). The gendered division of labor among STEM faculty and the effects of critical mass. *Journal of Diversity in Higher Education, 4*(3), 131-146. https://doi.org/10.1037/a0021831

Centola, D. M. (2013a). Homophily, networks, and critical mass: Solving the start-up problem in large group collective action. *Rationality and Society, 25*(1), 3-40. https://doi.org/10.1177/1043463112473734

Centola, D. M. (2013b). A simple model of stability in critical mass dynamics. *Journal of Statistical Physics, 151*(1-2), 238-253. https://doi.org/10.1007/s10955-012-0679-3

Chen, C. M., & Lou, M. F. (2014). The effectiveness and application of mentorship programmes for recently registered nurses: a systematic review. *Journal of Nursing management*, *22*(4), 433-442.

Clewell, B. C., Cohen, C. C. d., & Tsui, L. (2010). *Capacity building to diversify STEM: Realizing potential among HBCUs*. https://www.urban.org/sites/default/files/publication/32866/412312-Capacity building -to-Diversify-STEM-Realizing-Potential-among-HBCUs.PDF

Colon-Emeric, C. S., Bowlby, L., & Svetkey, L. (2012). Establishing faculty needs and priorities for peer-mentoring groups using a nominal group technique. *Medical Teacher*, *34*(8), 631-634.

Collins, J., Manning, K. L., & Carp, R. A. (2010). Gender, critical mass, and judicial decision making. *Law & Policy, 32*(2), 260-281. https://doi.org/10.1111/j.1467-9930.2010. 00317.x

Cooke, J. (2005). A framework to evaluate research capacity building in health care. *BMC Family Practice, 6*(44). https://doi.org/10.1186/1471-2296-6-44.

Colbys, L. A. & Ortman, M. J. (2015). United States Census Bureau. Projections of the Size and Composition of the U.S. Population: 2014 to 2060. https://www.census.gov/library/publications/2015/demo/p25-1143.html

Couch, S. C., Whalen, T. F., Wall, A. L., & Mentzel, T. K. (2015). Strategies for increasing the diversity of the healthcare workforce: Incorporating key stakeholders perspectives. *Journal of the Academy of Nutrition and Dietetics*, *115*(9), A55.

Creswell, J. W., & Plano Clark, V. L. (2011). Choosing a mixed methods design. *Designing and Conducting Mixed Methods Research*, *2*, 53-106.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage.

Cross, K. E., Moore, C. L., Manyibe, E. O., Aref, F., Washington, A. L., Umadjela, A., Sanders, P.R., Payma, H.S., Pandey, J., & Cyprian, D. (2015). New immigrating racial and ethnic populations and "trends impacts" on state vocational rehabilitation agencies. *Journal of Applied Rehabilitation Counseling, 46*(2), 20-34.

Cunningham, A., Park, E., & Engle, J. (2014). *Minority-serving institutions: Doing more with less*. https://vtechworks.lib.vt.edu/handle/10919/83120

Cunningham, A. F., & Parker, C. (1998). Tribal colleges as community institutions and resources. *New Directions for Higher Education, 1998*(102), 45–56. https://doi.org/10.1002/he.10204

de Brey, C., Musu, L., McFarland, J., Wilkinson-Flicker, S., Diliberti, M., Zhang, A., Branstetter, C., & Wang, X. (2019). *Status and Trends in the Education of Racial and Ethnic Groups 2018. NCES 2019-038*. National Center for Education Statistics. https://files.eric.ed.gov/fulltext/ED592833.pdf

Denzin, N. K. (2008). The new paradigm dialogs and qualitative inquiry. *International Journal of Qualitative Studies in Education, 21*(4), 315-325. https://doi.org/10.1080/09518390802136995.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). John Wiley & Sons.

Du Bois, W.E.B. (1903). The *talented tenth* (pp. 102-104). James Pott & Company.

Duckworth, A., & Duckworth, A. (2016). *Grit: The power of passion and perseverance* (Vol. 234). Scribner.

Dzau, V. J., McClellan, M. B., McGinnis, J. M., & Finkelman, E. M. (Eds). (2017). *Vital directions for health & health care: An initiative of the National Academy of Medicine*. Washington, DC: National Academy of Medicine. https://nam.edu/wp-content/uploads/2018/02/Vital-Directions-for-Health-and-Health-Care-Final-Publication-022718.pdf

Ellis, S. K. (2011). *The talented tenth revisited socialization and retention for Black junior faculty at HBCUs.* The University of Arkansas Little Rock.

Ellis, A. L., Smith, C. N., & Barnett, J. A. (2016). Graduate-level education at historically Black colleges and universities: A three-part qualitative exposition. In *Graduate Education at Historically Black Colleges and Universities (HBCUs)* (pp. 39-54). Routledge.

Epps, I. E., & Guidry, J. J. (2009). Building capacities among minority institutions to conduct disability research: What is the problem? *Journal of Minority Disability Research and Practice, 1*(1), 3–15.

Erickson, W., Lee, C., & Von Schrader, S. (2012). *Disability statistics from the 2010 American Community Survey*. www.disabilitystatistics.org.

Espinosa, L. L., Turk, J. M., & Taylor, M. (2017). Pulling back the curtain: Enrollment and outcomes at minority-serving institutions. https://www.acenet.edu/Documents/Pulling-Back-the-Curtain-Enrollment-and-Outcomes-at-Minority-serving institutions.pdf.

Espinosa, L.L, Kelchen, R., & Taylor, M. (2018). Minority serving-institutions as engines of upward mobility. *Center for Policy Research and Strategy*. https://www.acenet.edu/Documents/Minority-serving institutions-as-Engines-of-Upward-Mobility.pdf

Excelencia in Education. (2017). *Emerging Hispanic-serving institutions (HSIs): 2015-16.* Washington, DC: Excelencia in Education. https://www.edexcelencia.org/research/data/emerging-hispanic-serving-institutions-hsis-2015-2016

Feldman, M. D., Arean, P. A., Marshall, S. J., Lovett, M., & O'Sullivan, P. (2010). Does mentoring matter: Results from a survey of faculty mentees at a large health sciences university. *Medical Education Online, 15*, 10.3402/meo.v15i0.5063. http://doi.org/10.3402/meo.v15i0.5063

Fisher, J. A., & Kalbaugh, C. A. (2011). Challenging assumptions about minority participation in US clinical research. *American Journal of Public Health, 101*(12), 2217-2222. https://doi.org/10.2105/AJPH.2011.300279

Flores, S. M., & Park, T. J. (2013). Race, ethnicity, and college success: Examining the continued significance of the minority-serving institution. *Educational Researcher, 42*(3), 115–128. https://doi.org/10.3102/0013189X13478978

Frontera, W. R., Fuhrer, M. J., Jette, A. M., Chan, L., Cooper, R. A., Duncan, P. W., Ottenbacher, K.J., Peckham, P. H., RothD, E.J., & Tate, D. G. (2005). Rehabilitation medicine summit: Building research capacity. *The Journal of Spinal Cord Medicine, 29*(1), 70-81.

Garcia, G. A. (2017). Defined by outcomes or culture? Constructing an organizational identity for Hispanic-serving institutions. *American Educational Research Journal*, *54*(1_suppl), 111S-134S.

Gasman, M. (2010). *Comprehensive funding approaches for historically Black colleges and universities.* http://www.gse.upenn.edu/pdf/gasman/FundingApproachesHBCUs.pdf

Gasman, M., & Abiola, U. (2016). Colorism within the historically Black colleges and universities (HBCUs). *Theory Into Practice*, *55*(1), 39-45.

Gasman, M., & Conrad, C. F. (2013). Minority-serving institutions: Educating all students. https://vtechworks.lib.vt.edu/bitstream/handle/10919/89168/MinorityServingInstitutions.pdf?sequence=1&isAllowed=y

Gasman, M., Spencer, D., & Orphan, C. (2015). "Building bridges, not fences": A history of civic engagement at private Black colleges and universities, 1944–1965. *History of Education Quarterly*, *55*(3), 346-379.

George, S., Duran, N., & Norris, K. (2014). A systematic review of barriers and facilitators to minority research participation among African Americans, Latinos, Asian Americans, and Pacific Islanders. *American Journal of Public Health, 104*(2), 31.

Ginther, D. K., Haak, L. L., Schaffer, W. T., & Kington, R. (2012). Are race, ethnicity, and medical school affiliation associated with NIH R01 Type 1 Award probability for physician investigators? *Academic Medicine, 87*(11), 1516–1524. https://doi.org/10.1097/ACM.0b013e31826d726b

Ginther, D. K., Schaffer, W. T., Schnell, J., Masimore, B., Liu, F., Haak, L. L., & Kington, R. (2011a). Race, ethnicity, and NIH research awards. *Science, 333*(6045), 1015–1019. https://doi.org/10.1126/science.1196783

Ginther, D. K., Schaffer, W.T., Schnell, J., Masimore, B., Liu, F., Haak, L. L., & Kington, R. (2011b). Race disparity in grants: Empirical solutions vital response. *Science, 334*(6058), U154-U899. https://doi.org/10.2307/41351715

Goode, T. D., Carter-Pokras, O. D., Horner-Johnson, W., & Yee, S. (2014). Parallel tracks: Reflections on the need for collaborative health disparities research on race/ethnicity and disability. *Medical Care, 52*, S3-S8. https://doi.org/10.1097/MLR.0000000000000201

Hispanic Association of Colleges and Universities. (2018, April). 2019 FACT SHEET HISPANIC HIGHER EDUCATION AND HSIs. https://www.hacu.net/hacu/HSI_Fact_Sheet.asp

Hanover Research (2014). Building a Culture of Research: Recommended Practices. https://www.hanoverresearch.com/media/Building-a-Culture-of-Research-Recommended-Practices.pdf

Hardré, P. L., Beesley, A. D., Miller, R. L., & Pace, T. M. (2011). Faculty motivation to do research: Across disciplines in research-extensive universities. *The Journal of the Professoriate,* 5(1), 35-69.

Harley, D. A., Alston, R. J., Fennessee, W., & Wilson, T. (2000). Addressing diversity in rehabilitation education at HBCUs: Meeting desegregation challenges through majority student recruitment. *Rehabilitation Education, 14*(4), 369-383.

Harmon, N. (2012). *The Role of Minority-serving institutions in National College Completion Goals*. http://www.ihep.org/assets/files/publications/s-z/The_Role_of_Minority-serving institutions_FINAL_January_2012[1].pdf

Harvard Catalyst. (2010). *Cultural competence in research.* http://catalyst.harvard.edu/pdf/diversity/CCR-annotated-bibliography-10-12-10ver2-FINAL.pdf

Harvey, M., McIntyre, N., Thompson Heames, J., & Moeller, M. (2009). Mentoring global female managers in the global marketplace: Traditional, reverse, and reciprocal mentoring. *International Journal of Human Resource Management,* 20(6), 1344-1361. https://doi.org/10.1080/09585190902909863

Holden, L., Pager, S., Golenko, X., Ware, R. S., & Weare, R. (2012). Evaluating a team-based approach to research capacity building using a matched-pairs study design. *BioMed Central Family Practice, 13*(16), 1-10.

Hoppe, T. A., Litovitz, A., Willis, K. A., Meseroll, R. A., Perkins, M. J., Hutchins, B. I., Davis, A.F., Lauer, M.S., Valantine, H.A., Anderson, J.M., & Santangelo, G. M. (2019). Topic choice contributes to the lower rate of NIH awards to African-American/Black scientists. *Science Advances*, *5*(10), eaaw7238. https://doi.org/10.1126/sciadv.aaw7238

Horner-Johnson, W., Fujiura, G. & Goode, T. (2014, October). Healthcare at the intersection of disability, race, and ethnicity. *Medical Care, 52*(10), S1–S2. https://doi.org/10.1097/MLR.0000000000000220.

Humphreys, J. (2017). *HBCUs make America strong: The positive economic impact of historically Black colleges and universities*. Washington, DC: UNCF Frederick D. Patterson Research Institute. Retrieved from https://secure.uncf.org/page/-/pdfs/HBCU_TechnicalReport_5-17L.pdf.

Hurtado, S., Alvarado, A. R., & Guillermo-Wann, C. (2015). Thinking about race: The salience of racial identity at two-and four-year colleges and the climate for diversity. *The Journal of Higher Education*, *86*(1), 127-155.

Institute of Medicine. (2009). *Beyond the HIPAA privacy rule: Enhancing privacy, improving health through research*. Washington, DC: The National Academy Press. https://www.ncbi.nlm.nih.gov/books/NBK9578/pdf/Bookshelf_NBK9578.pdf

Interagency Committee on Disability Research. (2014). *Creating a sustainable interagency coordination network on disability research*. https://icdr.acl.gov/system/files/resources/Expert%20Panel%20Report.pdf

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, *1*(2), 112-133.

Johnson, S. J. (2013). Toward a useful model for group mentoring in public accounting firms. *International Journal of Business and Social Research, 3*(6), 1-7. https://doi.org//10.18533/ijbsr.v3i6.41

Kanter, R. M. (1977). Some effects of proportions on group life: Skewed sex ratios and responses to token women. *American Journal of Sociology, 82*(5), 965-990.

Kanter, R. M. (1993). *Men and women of the corporation*. Basic Books, Inc.

Karna, J. P., & Nath, D. C. (2015). Rotation sampling: Introduction and review of recent developments. *Journal. Assam Science Society, 56*(2), 90-111.

Katz, A. D., & Hoyt, W. T. (2014). The influence of multicultural counseling competence and anti-Black prejudice on therapists' outcome expectancies. *Journal of Counseling Psychology*, *61*(2), 299.

Kerdeman, D. (2015). Interpretation, Social Science, and Educational Research. In *International Handbook of Interpretation in Educational Research* (pp. 17-37). Springer, Dordrecht.

Koh, H. K., Graham, G., & Glied, S. A. (2011). Reducing racial and ethnic disparities: the action plan from the department of health and human services. *Health Affairs*, *30*(10), 1822-1829.

Kram, K. E. (1983). Phases of the mentor relationship. *Academy of Management Journal, 26*(4), 608-625. https://doi.org/10.2307/255910.

Lee, J. M., Jr. (2012). An examination of the participation of African American students in graduate education without public HBCUs. In R. T. Palmer, A. A. Hilton, & T. P. Fountaine (Eds.), *Black graduate education at historically Black colleges and universities: Trends, experiences, and outcomes* (p. 61–82). IAP Information Age Publishing.

Lee, J. M., Jr., & Keys, S. W. (2013). *Repositioning HBCUs for the future: Access, success, research, and innovation*. APLU Office of Access and Success Discussion Paper 2013-01. Washington, DC: Association of Public and Land-Grant Universities. http://www.aplu.org/library/repositioning-hbcus-for-the-future-access-success-research-and-innovation/file

Lewis, A., Bethea, J., & Hurley, J. (2009). Integrating cultural competency in rehabilitation curricula in the new millennium: keeping it simple. *Disability and Rehabilitation, 31*(14), 1161-1169. https://doi.org/10.1080/09638280902773760

Lewis, A. N., Shamburger, A., Head, C., Armstrong, A. J., & West, S. L. (2007). Section 21 of the 1992 Rehabilitation Act amendments and diversity articles. *Journal of Vocational Rehabilitation, 26*, 89–96.

Lewis, P., & Simpson, R. (2012). Kanter revisited: Gender, power and (in)visibility. *International Journal of Management Reviews, 14*(2), 141-158. https://doi.org/10.1111/j.1468-2370.2011.00327.x

Li, B., Millwater, J., & Hudson, P. (2008, November). *Building research capacity: Changing roles of universities and academics*. Paper presented at the meeting of the Australian Association of Research in Education (AARE) Conference, Brisbane, Australia.

Liu, W., Sidhu, A., Beacom, A. M., & Valente, T. W. (2017). Social network theory. In P. Rossler, C. A. Hoffner, & L. van Zoonen (Eds.). *The International Encyclopedia of Media Effects*, 1-12. John Wiley & Sons. https://doi.org/10.1002/9781118783764.wbieme0092

Lo, C. O., & Porath, M. (2017). Paradigm shifts in gifted education: An examination vis-à-vis its historical situatedness and pedagogical sensibilities. *Gifted Child Quarterly, 61*(4), 343–360. https://doi.org/10.1177/0016986217722840

Louis, R. P. (2007). Can you hear us now? Voices from the margin: Using Indigenous methodologies in geographic research. *Geographical Research, 45*(2), 130-139. https://doi.org/10.1111/j.1745-5871.2007.00443.x

Lukyanova, V. V., Balcazar, F. E., Oberoi, A. K., & Suarez-Balcazar, Y. (2014). Employment outcomes among African Americans and Whites with mental illness. *Work, 48*(3), 319–328. https://doi.org/10.3233/WOR-131788

Malik, M., Kumari, S., Manalai, P., & Hipolito, M. (2017). Illustrating and analyzing the processes of multi-institutional collaboration: Lessons learnt at Howard University Hospital. *Internal Medicine Review (Washington, DC: Online), 3*(5), 10.18103/imr.v3i5.462.

Manyibe, B. M., Manyibe, E. O., & Otiso, K. M. (2013). College student leadership development: An examination of pre-college leadership development of African students in the United States. *The Journal of Negro Education, 82*(4), 422-432.

Manyibe, E. O., Moore, C. L., Aref, F., Sagini, M. M., Zeng, S., & Alston, R. J. (2017). Minority-serving institutions and disability, health, independent living, and rehabilitation research participation challenges: A review of the literature and policy. *Rehabilitation Research, Policy, and Education, 31*(3), 174–193. https://doi.org/10.1891/2168-6653.31.3.174

Manyibe, E. O., Moore, C. L., Aref, F., Washington, A. L., & Hunter, T. (2015). An emerging conceptual framework for conducting disability, health, independent living, and rehabilitation research mentorship at minority-serving institutions. *Journal of Rehabilitation, 81*(4), 25–27.

Manyibe, E. O., Moore, C. L., & Kampfe, C. M. (2012). Competitive employment outcomes and spinal cord injury: Relationship between race/ethnicity, gender, age, education and rehabilitation services. *Rehabilitation Professional, 20*(1).

Manyibe, E. O., Moore, C. L., Wang, N., Davis, D., Aref, F., Washington, A. L., Johnson, J., Eugene-Cross, K., Muhammad, A., & Lewis, A. (2017). Career development factors for minority disability and health research leaders: A key informant study. *Rehabilitation Research, Policy, and Education, 31*(3), 208-229. https://doi.org//10.1891/2168-6653.31.3.208

Maxwell, G., & Granlund, M. (2011). How are conditions for participation expressed in education policy documents? A review of documents in Scotland and Sweden. *European Journal of Special Needs Education, 26*(2), 251–272. https://doi.org/10.1080/08856257.2011.563610.

McGill, M. M., & Settle, A. (2012). Identifying effects of institutional resources and support on computing faculty research productivity, tenure, and promotion. *International Journal of Doctoral Studies*, *7*, 167-198.

Merton, R. K. (1968). The Matthew effect in science: The reward and communication systems of science are considered. *Science*, *159*(3810), 56-63.

Moore, C. L., Aref, F., Manyibe, E. O., & Davis, E. (2016). Minority entity disability, health, independent living, and rehabilitation research productivity facilitators: A review and synthesis of the literature and policy. *Rehabilitation Counseling Bulletin, 59*(2), 94-107. https://doi.org/10.1177/0034355214568527.

Moore, C. L., Johnson, J. E., Manyibe, E. O., Washington, A. L., Uchegbu, N. E., Cross, K. E., Hollis-Staten B., Turner-Whittaker, T. & Edwards, Y. (2012). Policy and systems issues limiting the participation of historically Black colleges and universities in the federal disability research agenda. *Rehabilitation Research, Policy, and Education, 26*(1), 67–82.

Moore, C. L., Manyibe, E. O., Aref, F., & Washington, A. L. (2017). Research capacity building: A historically Black college/university-based case study of a peer-to-peer mentor research team model. *Rehabilitation Research, Policy, and Education, 31*(3), 283-308. https://doi.org//10.1891/2168-6653.31.3.283

Moore, C. L., Manyibe, E. O., Sanders, P., Aref, F., Washington, A. L., & Robertson, C. Y. (2017). A disability and health institutional research capacity building and infrastructure model evaluation: A tribal college-based case study. *Rehabilitation Research, Policy, and Education, 31*(3), 309–336. https://doi.org/10.1891/2168-6653.31.3.309

Moore, C. L., & Wang, N. (2016). A national benchmark investigation of return-to-work outcome rates between African American, Native American or Alaskan Natives, Latino, Asian American or Pacific Islander, and non-Latino White veterans served by state vocational rehabilitation agencies: Application of bootstrap data expansion. *Journal of Vocational Rehabilitation, 45*(2)*,* 133-147. https://doi.org/10.3233/JVR-160818

Moore, C. L., Wang, N., Davis, D., Aref, F., Manyibe, E. O., Washington, A. L., Johnson, J., Eugene-Cross, K., Muhammad, A., & Jennings-Jones, D. (2017). Key informant perspectives on federal research agency policy and systems and scientific workforce diversity development: A companion study. *Rehabilitation Research, Policy, and Education. 31*(3), 230-252. https://doi.org/10.1891/2168-6653.31.3.230

Moore, C. L, Wang, N., Davis, D., Aref, F., Manyibe, E. O., Washington, A. L., Johnson, J. Eugene-Cross, K., Muhammad, A., & Quinn, J. (2015). Disability, health, independent living, and rehabilitation research leaders from traditionally underrepresented racial and ethnic populations: Career development and success factors. *Journal of Rehabilitation, 81*(1), 19-33.

Moore, C. L., Wang, N., Eugene-Cross, K., & Washington, A. L. (2016). Immigration trends' impacts on state vocational rehabilitation agency minority application rates: An empirical forecast model demonstration study. *Journal of Vocational Rehabilitation*, *45*(2), 197-212.

Moore, C. L., Wang, N., Johnson, J., Manyibe, E. O., Washington, A. L., & Muhammad, A. (2016). Return-to-work outcome rates of African American versus White veterans served by state vocational rehabilitation agencies: A randomized split-half cross-model validation research design. *Rehabilitation Counseling Bulletin*, *59*(3), 158-171. https://doi.org/10.1177/0034355215579917

Morris, L. V. (2017). Reverse mentoring: untapped resource in the academy? *Innovative Higher Education*, *42*(4), 285-287.

National Academies of Sciences, Engineering, and Medicine (2019). *Minority-serving institutions: America's Underutilized Resource for Strengthening the STEM Workforce.* Washington, DC: The National Academies Press. https://doi.org/10.17226/25257.

National Institute on Disability and Rehabilitation Research. (2011). *Research capacity building summit: Critical conversations on repositioning NIDRR's investment for the future.* Alexandria, VA, July 21-22.

National Institute on Disability, Independent Living, and Rehabilitation Research. (2015, June). *Section 21 Capacity Building Meeting*. Washington, DC.

National Academies of Sciences, Engineering, and Medicine. (2017). *A new vision for center-based engineering research*. National Academies Press. https://www.nap.edu/catalog/24767/a-new-vision-for-center-based-engineering-research

National Research Council (2015). Enhancing the effectiveness of team science. In N. J. Cooke and M. L. Hilton (Eds.), *Committee on the science of team science, board on behavioral, cognitive, and sensory sciences, division of behavioral and social sciences and education.* Washington, DC: The National Academies Press.

Nick, J. M., Delahoyde, T. M., Del Prato, D., Mitchell, C., Ortiz, J., Ottley, C., Young, P., Cannon, S.B., Lasater, K., Reising, D., & Siktberg, L. (2012). Best practices in academic mentoring: a model for excellence. *Nursing Research and Practice, 2012*, 937906. https://doi.org/10.1155/2012/937906

Obama, B. (2011). Executive Order 13592--*Improving American Indian and Alaska Native educational opportunities and strengthening tribal colleges and universities.* Washington, DC: The White House, Office of the Press Secretary. https://obamawhitehouse.archives.gov/the-press-office/2011/12/02/executive-order-13592-improving-american-indian-and-alaska-native-educat

Ofili, E. O., Fair, A., Norris, K., Verbalis, J. G., Poland, R., Bernard, G., Stephens, D.S., Dubinett, S.M., Imperato-McGinley, J., & Dottin, R. P. (2013). Models of interinstitutional partnerships between research intensive universities and minority-serving institutions (MSI) across the Clinical Translational Science Award (CTSA) Consortium. *Clinical and Translational Science, 6*(6), 435–443. https://doi.org/10.1111/cts.12118

Osanloo, A., & Reyes, L. (2013). Hispanic-serving institutions. *Multicultural America*, *2*, 1083- 1086. Sage.

Owusu-Ansah, F. E., & Mji, G. (2013). African indigenous knowledge and research. *African Journal of Disability*, *2*(1), 30. https://doi.org/10.4102/ajod.v2i1.30

Owen, G. T. (2014). Qualitative methods in higher education policy analysis: Using interviews and document analysis. *The Qualitative Report, 19*(26), 1–19. https://nsuworks.nova.edu/tqr/vol19/iss26/2

Pager, S., Holden, L., & Golenko, X. (2012). Motivators, enablers, and barriers to building allied health research capacity. *Journal of Multidisciplinary Healthcare*, *5*, 53. https://doi.org/10.2147/JMDH.S27638

Patry, J. L. (2013). Beyond multiple methods: Critical multiplism on all levels. *International Journal of Multiple Research Approaches*, *7*(1), 50-65.

Pece, C. (2019). *Federal science and engineering obligations to academic institutions increase 2%; Support to HBCUs declines 17%.* National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions. https://www.nsf.gov/statistics/2019/nsf19314/nsf19314.pdf.

Perna, L. W., Gasman, M., Gary, S., Lundy-Wagner, V., & Drezner, N. D. (2010). Identifying strategies for increasing degree attainment in STEM: Lessons from minority-serving institutions. *New Directions for Institutional Research, 2010*(148), 41-51.

Pinto, R., de Jonge, V. N., & Marques, J. C. (2014). Linking biodiversity indicators, ecosystem functioning, provision of services and human well-being in estuarine systems: Application of a conceptual framework. *Ecological Indicators, 36*, 644-655. https://doi.org/10.1016/j.ecolind.2013.09.015

Rabionet, S. E., Santiago, L. E., & Zorrilla, C. D. (2009). A multifaceted mentoring model for minority researchers to address HIV health disparities. *American Journal of Public Health, 99*(S1), S65-S70. https://doi.org/10.2105/AJPH.2008.153635

Ranjan, A., Kumar, R., Sinha, A., Nanda, S., Dave, K. A., Collette, M. D., Papadimos, T.J., & Stawicki, S. P. (2016). Competing for impact and prestige: Deciphering the "alphabet soup" of academic publications and faculty productivity metrics. *International Journal of Academic Medicine*, *2*(2), 187.

Rodríguez, J., Campbell, K., Fogarty, J., & Williams, R. (2014). Underrepresented minority faculty in academic medicine: a systematic review of URM faculty development. *Family Medicine*, *46*(2):100-104.

Roederer, M., Marciniak, M. W., O'Connor, S. K., & Eckel, S. F. (2013). An integrated approach to research and manuscript development. *American Journal of Health-System Pharmacy*, *70*(14), 1211-1218.

Rogers, J. D. (2012). Research centers as agents of change in the contemporary academic landscape: their role and impact in HBCU, EPSCoR, and majority universities. *Research Evaluation, 21*(1), 15-32.

Rosen-Reynoso, M., Kwan, N., Blackburn, N., Sotnik, P., Manyibe, E. O., & Moore, C. L. (2017). Lessons learned from a collaborative approach to research and mentorship for minority-serving institutions. *Rehabilitation Research, Policy, and Education*, *31*(3), 272-282.

Sanders, P., Davis, D., Moore, C. L., & Manyibe, E. O. (2017). New knowledge about research capacity building: An autoethnographic approach to understanding skill enhancement strategies for minority researchers with disabilities. *Rehabilitation Research, Policy, and Education, 31*(3), 253-271. https://doi.org/10.1891/2168-6653.31.3.253.

Santiago, D. A., & Andrade, S. J. (2010*). Emerging Hispanic-serving institutions (HSIs): Serving Latino students*. Washington, DC: Excelencia in Education (NJ1). https://files.eric.ed.gov/fulltext/ED508202.pdf

Saunders, K.M. & Nagle, B.T. (2018). *HBCUs Punching Above Their Weight: A State-Level Analysis of Historically Black College and University Enrollment Graduation*. Washington, DC: UNCF Frederick D. Patterson Research Institute. http://hdl.voced.edu.au/10707/524995.

Sarche, M., & Spicer, P. (2008). Poverty and health disparities for American Indian and Alaska Native children. *Annals of the New York Academy of Sciences, 1136*(1), 126-136. https://doi.org/10.1196/annals.1425.017

Schmidt, J. J., & Akande, Y. (2011). Faculty perceptions of the first-generation student experience and programs at tribal colleges. *New Directions for Teaching and Learning, 2011*(127), 41-54. https://doi.org/10.1002/tl.456

Shreve, B. (2015). On a dream and a prayer: The promise of world Indigenous higher education. *Tribal College, 26*(3), 18-22.

Simonds, V. W., & Christopher, S. (2013). Adapting Western research methods to Indigenous ways of knowing. *American Journal of Public Health, 103*(12), 2185-2192. https://doi.org/10.2105/AJPH.2012.301157.

Smith, E. (2013, June 10). Opinion: The Dilemma of Diversity. *The Scientist.* https://www.the-scientist.com/opinion/opinion-the-dilemma-of-diversity-39197

Spong, C. Y., & Bianchi, D. W. (2018). Improving public health requires inclusion of underrepresented populations in research. *Journal of the American Medical Association, 319*(4), 337-338.

Sternberg, R. J. (2013). Self-Sabotage in the Academic Career. *Chronicle of Higher Education*. https://www.chronicle.com/article/self-sabotage-in-the-academic-career/

Sutherland, K., Wilson, M., & Williams, P. (2013*). Success in Academia? the experiences of early career academics in New Zealand.* Wellington, New Zealand: Ako Aotearoa National Centre for Tertiary Teaching Excellence.

Sutton, M. Y., Lanier, Y. A., Willis, L. A., Castellanos, T., Dominguez, K., Fitzpatrick, L., Miller, K. S. (2013). Strengthening the network of mentored, underrepresented minority scientists and leaders to reduce HIV-related health disparities. *American Journal of Public Health*, *103*(12), 2207-2214.

Thunder, D. H. H. I. (2015). Fostering the intellectual and tribal spirit: The role of the chief academic officer. *Tribal College, 26*(4), 34.

Toldson, I. A. (2016). The funding gap between historically Black colleges and universities and traditionally White institutions needs to be addressed (Editor's Commentary). *The Journal of Negro Education*, *85*(2), 97-100.

Torchia, M., Calabro, A., & Huse, M. (2011). Women directors on corporate boards: From tokenism to critical mass. *Journal of Business Ethics, 102*(2), 299-317.

Treadwell, H. M., Braithwaite, R. L., Braithwaite, K., Oliver, D., & Holliday, R. (2009). Leadership development for health researchers at historically Black colleges and universities. *American Journal of Public Health*, *99*(S1), S53-S57.

Trump, D. J. (2017). Executive Order 13779--*Presidential executive order on the white house initiative to promote excellence and innovation at historically Black colleges and universities*. Washington, DC: The White House, Office of the Press Secretary. https://www.whitehouse.gov/presidential-actions/presidential-executive-order-white-house-initiative-promote-excellence-innovation-historically-black-colleges-universities/

United Negro College Fund. (2017). *HBCU's Make America Strong: Economic Impact of Historically Black Colleges and Universities.* https://www.uncf.org/wp- content/uploads/HBCU_Consumer_Brochure_FINAL_APPROVED.pdf

U.S. Department of Education, (2013). *The Condition of Education 2013.* The National Center for Education Statistics (NCES). https://nces.ed.gov/pubs2013/2013037.pdf

U.S. Department of Labor (2017). U.S. Bureau of Labor Statistics. https://www.bls.gov/opub/mlr/2017/home.htm

Vanner, C. (2015). Positionality at the center: Constructing an epistemological and methodological approach for a western feminist doctoral candidate conducting research in the postcolonial. *International Journal of Qualitative Methods*, *14*(4), 1-12.

van der Roest, J. W., Spaaij, R., & van Bottenburg, M. (2015). Mixed methods in emerging academic subdisciplines the case of sport management. *Journal of Mixed Methods Research, 9*(1), 70-90.

Voorhees, R. A. (2003). Characteristics of tribal college and university faculty. *The American Indian College Fund*, 1-17.

Walters, K. L., & Simoni, J. M. (2009). Decolonizing strategies for mentoring American Indians and Alaska Natives in HIV and mental health research. *American Journal of Public Health, 99*(S1), S71-S76. doi: 10.2105/AJPH.2008.136127

Weaver, H. N. (2015). Disability through a Native American lens: examining influences of culture and colonization. *Journal of Social Work in Disability & Rehabilitation, 14*(3-4), 148-162. doi: 10.1080/1536710X.2015.1068256

Wenger, E. (2002) Communities of practice. In J. Neil, N. Smelser & P. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 2339-2342). Pergamon Press.

Wong, E. C., & Miles, J. N. (2014). Prevalence and correlates of depression among new US immigrants. *Journal of Immigrant and Minority Health, 16*(3), 422–428. https://doi.org/10.1007/s10903-013-9781-0.

Worthington, C. A., O'Brien, K. K., Mill, J., Caine, V., Solomon, P., & Chaw-Kant, J. (2016). A mixed-methods outcome evaluation of a mentorship intervention for Canadian nurses in HIV care. *Journal of the Association of Nurses in AIDS Care*, *27*(5), 677-697.

Yanagihara, R., Chang, L., & Emst, T. (2009). Building infrastructure for HIV/AIDS and mental health research at institutions serving minorities. *American Journal of Public Health, 99*(S1), S82–S86. https://doi.org/10.2105/AJPH.2008.136903.

Yang, J., Vannier, M. W., Wang, F., Deng, Y., Ou, F., Bennett, J., Liu, Y., & Wang, G. (2013). A bibliometric analysis of academic publication and NIH funding. *Journal of Informetrics*, *7*(2), 318-324.

Yee, K. (2015). America COMPETES Act's effect on NASA's Education and Public Outreach Programs. *Space Policy, 31*, 27-30.

Zea, M. C., & Bowleg, L. (2016). The final frontier-transitions and sustainability: From mentored to independent research. *AIDS and Behavior, (20)*2, S311–S317. https://doi.org/10.1007/s10461-016-1368-z.

APPENDIX A
Protocols Guiding Intervention Delivery

LANGSTON
UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Research Infrastructure Improvement Strategic Planning Meeting Protocol

[NAME OF INSTITUTION HERE]

Research Project 5:
The Minority-Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation

Research Team:
Dr. Corey L. Moore, Principal Investigator (PI)
Dr. Edward O. Manyibe, Co-Principal Investigator
Dr. Andre L. Washington, Co-Principal Investigator

Consultant/Facilitator:
[NAME OF CONSULTANT HERE]

Funding Agency:

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

Acknowledgement: The contents of this document were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RT5024-01-00). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this document do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the federal government.

Research Infrastructure

Research infrastructure includes major research services or equipment and specialized support staff that constitute direct systems components that promote, foster, and support faculty scholars and investigators research, development, and scholarly efforts. These systems can compliment institutions' teaching and service functions while simultaneously supporting their interdisciplinary research and development agendas. Effective campus-wide research infrastructure systems are also essential for research skill building (i.e., methodology and grant writing skills) among junior-level faculty scholars as well as enhancing their levels of research productivity.

Participants:

This strategic planning group will be comprised of 15-20 key stakeholders representing institutional administration, faculty members, researchers, staff, students, and external constituents such as state vocational rehabilitation agency (SVRA) personnel, state independent living (IL) personnel, and other key personnel representing service agencies external to the institution.

Purpose of Protocol:

The purpose of this protocol is to provide a uniformed standard for the research capacity building science (intervention components) that can be applied to meetings across institutions to guide the research infrastructure improvement strategic planning meeting sessions. In short, the protocol is intended to standardize the research infrastructure interventions and facilitate a community-based action research approach. In this approach, interventions are introduced to the target institution or groups, observations are made, and based on these observations researchers determine the next best course of action such as what other intervention(s) needs to be provided, and whether to wax and wane the intervention. This rigorous strategic planning process encompasses several phases and activities as shown in the timelines section below.

Reporting:

Information generated from the meeting discussions will be used to develop the institution's Disability, Health, Independent Living, and Rehabilitation Research Infrastructure Improvement Strategic Plan.

Strategic Planning Timelines

<u>Phase I. Preliminary Logistics</u>

1. Select Strategic Plan Research Team
2. Strategic Plan Research Team meeting (Once a week).
3. Select consultant(s) by April 5, 2015
4. Subcontracts returned from consultant(s) by March 30, 2015.
5. Develop Research Infrastructure Technical Assistance plan by April 10, 2015.

Phase II. Consultative Meetings

6. Consultative planning meetings with consultants and LPTC Team (as needed).
7. Strategic Planning protocol completed by April 15, 2015.

Phase III. On-Campus Meeting

8. Select on campus RIISP meeting participants by May 8, 2014.
9. Facilitate Research Infrastructure Improvement Strategic Plan (RIISP) meeting on *May 11-13, 2015*.

Phase V. Finalize Plan/Implementation

10. First RIISP report Draft submitted for stakeholders' review and feedback (expected date: Goes here)
11. Final RIISP and Report: Consultants to submit RIISP report within two weeks after receiving feedback from stakeholders (expected date: Goes here).
12. Little Priest Tribal College begin implementing plan

Phase V. Evaluation

13. Research team will evaluate RIISP implementation progress and report findings (expected date: Ongoing).

Onsite Steps:

Materials potentially needed for the session: (Notepads and pencils, computer with presentation software, list of participants, markers, masking tape, name tags, refreshments, watch or clock, flip chart or easel paper, focus group script).

General Procedures and Guidelines

BEFORE THE SESSION

Identification of Participants: Name tents (if seating arrangement includes a table) or name tags (if seating arrangement is a circle without a table) will be used. The advantages of name tents or name tags include: (1) putting everyone on a first name basis, (2) allowing the moderator(s) to refer to participants by name, and (3) facilitating note-taking.

Arrival of Participants: All participants will be greeted as they arrive and engaged in small talk to make them feel more at ease. Instructions regarding refreshments will be provided.

DURING THE SESSION

The consultants will facilitate the discussion. LU-RRTC investigators will only observe and take notes.

Introduction to Planning Meeting:

The introduction script, prepared in advance (see page 4), includes the introduction of the moderators and LU-RRTC investigators, the purpose/objectives of the meeting, the guarantee of confidentially, and the length of the session. Although the introduction is prepared in advance, the moderator should be familiar enough with the introduction to make eye contact with participants.

Introduction of Participants: To begin the meeting, have all the participants go around the room and introduce themselves. This introduction can include the participant's name, job position, and their expectations about the meeting.

Discussion Guiding Questions: The moderator poses the first question listed on the *Discussion Guiding Questions section*. These questions are posed to the group as a whole.

Introduction Script

Hello and thank you for agreeing to be part of the Research Infrastructure Improvement Strategic Planning (RIISP) meeting. We appreciate your willingness to participate. I am _____ and I serve as _____ for Langston University Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities (LU-RRTC). _____ and _____, LU-RRTC consultants, will facilitate the Disability, Health, Independent Living, and Rehabilitation Research Capacity Building and Infrastructure Improvement Strategic Planning Meeting. The researchers in the room, _____, from LU-RRTC, and I will be observers.

My main objective at this juncture of the meeting is to provide you brief background information about this meeting. Langston University, a historically Black college/university (i.e. HBCU), was fortunate to be awarded a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR) to fund a new Rehabilitation Research and Training Center (RRTC) on Research and Capacity Building for Minority Entities. The MISSION of the RRTC is to improve minority entities' (i.e., HBCUs, Hispanic-serving institutions [HSIs], and American Indian tribal colleges/universities [AITCUs]) disability and rehabilitation research capacity and infrastructure by conducting a programmatic line of research examining experiences and outcomes of persons from traditionally underserved racial and ethnic populations and communities and capacity building efforts. The RRTC also serves as a center of national excellence in rehabilitation, research capacity building and research infrastructure research. The RRTC works in partnership with the Institute for Community Inclusion (ICI) at the University of Massachusetts Boston (a minority entity) and Boston Children's Hospital, Oklahoma Department of Rehabilitation Services (ODRS), and South Carolina State University (SCSU [an HBCU]). Dr. Corey L. Moore is the Principal Investigator/Research Director.

In 2013, the RRTC invited Minority Entities to apply to participate in our Institutional Research Capacity Building and Infrastructure Model (IRCBIM) study. IRCBIM, an emerging research capacity model for minority entities, consists of six Intervention Components (ICs), which include: Post-Doctoral Training: Peer-to-Peer Mentor Research Team Academy, Communities of Practice (CoP), Grant-Writing and Management Training, Technical Assistance and Consulting: Infrastructure Issues, Research Support Resources, and Technological Support Consultation. The six intervention components are interconnected and focus on individual, institutional, and systems levels that are necessary to develop sustainable

research capacity at MEs. Six (6) Minority Entities were selected from the applicant pool to participate in IRCBIM. Each applying institution was required to nominate 2-3 research fellows to be considered for participation in the Peer-to-Peer Mentor Research Team Academy, a research mentoring program designed to (a) enhance ME-based faculty scholars' research and grant writing skills and (b) build their research self-efficacy by providing them with state-of-the-science knowledge of scientifically valid measurement strategies and methodologies, and direct hands-on experience in the conduct of research and grant proposal development. We are very pleased to have your institution represented as one (1) of the six (6) minority serving institutions selected to participate in the Institutional Research Capacity Building Infrastructure Model (IRCBIM).

In an effort to gain a better understanding about the unique research capacity building (RCB) and research infrastructure (RI) development needs at your institution, we analyzed data (qualitative and quantitative) garnered from the Comprehensive Needs Assessment (CNA) - completed by research Fellows, brief web-based survey targeting administrators, faculty, staff, and students, and document review of your institution's IRCBIM application. The analysis of these data were accomplished across three broad RCB and RI areas (i.e., individual, institutional, and systems) and the following ten specific domains; (a) leadership, (b) structures, (c) collaboration, (d) external support, (e) access to resources, (f) research networks, (g) skills and knowledge, (h) ongoing learning, (i) participation, and (j) psychological wellbeing. The results showed that several interventions are needed to enhance RCB and RI at your institution. Based on these findings, the LU-RRTC has developed a "Plan of Action" that will provide the several technical assistance and consulting services to address identified RCB and RI needs.

One of those key actions - **the Research Infrastructure Improvement Strategic Plan (RIISP)** - is the reason we are having this meeting. The plan that will culminate from this meeting will provide a blue print that will facilitate an increase in the quantity and quality of disability, health, independent living, and rehabilitation research. For the purpose of this meeting, research infrastructure includes major research services or equipment, and specialized support staff that constitute direct support components that help to further the institutions interdisciplinary research and discovery agendas. Examples of research infrastructure include facilities such as the Sponsored Programs Office, Business Office, and Comptroller, relevant administrative and technical staff and student research assistants, institutional research ethos or value for research (enhanced through methodology and grant writing training and mentoring programs), technology, seed money grant programs, rewards systems, institutional review board, and networks and relationships with external constituents that can support the institution's research efforts such as state vocational rehabilitation agencies, independent living service agencies, and health care agencies. Our hope is that this meeting will generate critical information that will facilitate the development of an effective Research Infrastructure Improvement Strategic Plan for _[Insert Institution here]_. In conclusion, we wish to inform you that we will acknowledge your contributions by including your names in the strategic planning report. Once again, I thank each of you for attending this meeting.

Ground Rules

1. *We Want You to Do the Talking*: We would like everyone to participate. I may ask for your participation if I haven't heard from you in a while.
2. *There are No Right or Wrong Responses*: Every person's experiences and opinions are import. Please speak up whether you agree or disagree. We want to hear a wide range of opinions.
3. *What is Said in this Room Stays Here*: We want you to feel comfortable sharing when sensitive issues come up.

We'll start by asking you to tell us your name, and a little about your occupational position and following that we will follow today's agenda. Thank you.

Objectives

1. To identify those particular areas of Research Infrastructure that are strongest and those that need improvement.
2. To generate critical information to facilitate the development of a Research Infrastructure Improvement Strategic Plan (RIISP).
3. Identify values, goals, and strengths of the institution, as well as the risks stemming from both the external and internal environments
4. Develop SMART (specific, measurable, attainable, realistic, time bound) actions to address research infrastructure gaps.

Research Infrastructure Domain	Examples of Infrastructure components	Sample Question
Leadership	• Research culture - values • Vision and mission statements • Incentives: Monetary support or release time to conduct research • Research seed and start-up funds • Human resources	• Is research infrastructure improvement prioritized? • Does the institution have an incentive mechanism that encourages academics to engage in research? • Is there a process which leads academics into research? • How are the expectations of the institution expressed with respect to research? • How are academics' innovative ideas supported and promoted for further development? • What steps need to be taken to establish desired research culture?
Structure	• Sponsored programs office effectiveness • Institutional Review Board effectiveness • Business office effectiveness • Adequacy of technological infrastructure • Adequacy of physical infrastructure - buildings and office space.	• What are the strengths and weakness? • How can the weaknesses be addressed? • What is the desired goal?

Collaboration	• Research partnerships and alliances development and nurturing - between other minority entities, traditionally White institutions, and international institutions. • Partnerships with community agencies – SVRA, Independent Living Council, health agencies, etc	• What types of research collaborations at the institutional level exist? • How can they be enhanced or strengthened?
External Support	• Grant proposal review panel opportunities • Access to federal research funding	• How can the institution encourage its members to participate in grant proposal review panels? • What infrastructure does the institution need to have established that would enhance its access to federal research funds?
Access to Resources	• Technological resources -computers, printers, statistical software (e.g., SPSS, Nvivo, Endnote) • Library resources – e.g., databases, access to the library, etc • Formal mentoring	• What research resources are available to support research efforts? • How can they be improved? • Which resources are missing that hinder research productivity?
Research Network	• Availability of systems that facilitate engagement between faculty members and other research actors • Systems that promotes	• How can faculty members be assisted to engage with research actors (research leaders, peer investigators)?
Skills and Knowledge	• Infrastructure that support skills and knowledge development (e.g., Research methodology and grant writing trainings)	• What professional development programs need to be improved or developed to expand junior investigators research skills and knowledge?
Ongoing Learning	• Infrastructure that support lifelong learning (e.g., Conference participation funds; peer reviewer opportunities)	• What infrastructure need to be improved or developed to facilitate ongoing learning?
Participation	• Infrastructure that supports investigators' involvement in shared governance	• How are investigators involved in decision-making processes, especially as pertains to grant management?
Psychological Well-being	• Infrastructure that support Wellness (e.g., stress management, coping, and resiliency programs)	• What are steps that need to be taken to promote psychological well-being of investigators?

Discussion Guiding Questions

Question 1: What is the big idea?

Probe 1: Based on your knowledge and experience, what is research infrastructure?

Probe 2: In your opinion, what are some of the reasons why _[Name of institution here]__should invest in Research Infrastructure Improvement?

Question 2: Based upon your experiences and/or knowledge, what would you say should be ___[Name of institution here]__research vision?

Probe 1: What do you feel the research strengths of the college are?

*Probe 2***:** What research aspect(s) of the college do you feel you are most known for?

*Probe 3***:** If there was one thing you felt that other people needed to know about your institution pertaining to research, what would it be?

Question 3: All institutions of higher education have research infrastructure areas that need improvement. In your opinion, what research areas would you want to see _[Name of institution here]__ improve?

Probe 1: What do you think are some the research weaknesses of_[Name of institution here]__?

Probe 2: What are some research infrastructure areas that you feel could be strengthened?

Question 4: As the institution moves forward with its Research Infrastructure Improvement Strategic Planning efforts, what areas, initiatives, or activities would you like to see your institution focus on in the future?

Probe 1: What do you want _[Name of institution here]__ to be known for as relates to research?

Probe 2: Thinking about research, what is _[Name of institution here]__ not currently doing that you would like to see it do in the future?

Probe 3: How do you get from where you are today to where you want to be in the future?

Probe 4: What are the steps that you will have to take to create your desired research infrastructure?

Question 5: What do you want to see accomplished to demonstrate that *Research Infrastructure Improvement* has taken place at _[Name of institution here]__?

Probe 1: Where do you want to go from here?

Probe 2: What desired outcome do you want to see from this strategic planning meeting?

Question 5. Before we conclude this meeting, is there anything else not covered in our discussion that is important to you regarding Research Infrastructure Improvement?

Probe 1: Do you have additional comments you would like to share? Do you have any questions before we leave?

We would like to thank each of you for taking the time to participate in our discussion and sharing your opinions. Your perspectives and views are very valuable to the future of _[Name of institution here]__and the community at large. We greatly appreciate your honesty.

LANGSTON UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Office of Sponsored Programs (OSP) Consultation and Technical Assistance (TA) Protocol

[NAME OF INSTITUTION HERE]

Research Project 5:
The Minority-Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation

Research Team:
Dr. Corey L. Moore, Principal Investigator (PI)
Dr. Edward O. Manyibe, Co-Principal Investigator
Dr. Andre L. Washington, Co-Principal Investigator

Consultant/Facilitator:
[NAME OF CONSULTANT HERE]

Funding Agency:

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

Acknowledgement: The contents of this document were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RT5024-01-00). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this document do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the federal government.

Introduction Script:

Hello and thank you for agreeing to be part of the *Office of Sponsored Programs (OSP) Research Capacity Consultation and Technical Assistance (TA)*. We appreciate your willingness to participate. I am __[NAME OF CONSULTANT HERE],__ and I serve as Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities consultant. I will facilitate today's *Consultation and Technical Assistance meeting*.

The reason we are having this meeting is to provide you with innovative tools that you can use to develop OSP best practices. Currently the federal disability, independent living, health, and rehabilitation research enterprise lacks the "critical mass" of disability researchers from American Indian tribal colleges and universities, historically Black colleges and universities, and Hispanic serving institutions needed to lead federally sponsored R&D projects and to answer the large questions that policy makers, federal disability research enterprise leaders and staff, rehabilitation administrators and service providers, advocates, and persons with disabilities need answered. We have seen a drastic reduction in the number of disability research leaders from traditionally underrepresented populations, and there has been a decrease in the number of peer reviewed articles and other scholarly pieces examining and reporting on related multicultural rehabilitation issues. Consequently, there exists a void in the research literature, and this research gap must be addressed.

The small number of ME based faculty investigators engaging in disability and rehabilitation research indicates clearly that the voices of minorities may as well be silent when disability, independent living, health, and rehabilitation policies are formulated and implemented. Additionally, the way disability, independent living, health, and rehabilitation are defined, measured, and interpreted may not reflect the realities of people with disabilities from traditionally underrepresented populations. A critical need thus exist for increasing both the number and quality of researchers from traditionally underrepresented racial and ethnic populations, to include those employed at minority entities available to study disability, independent living, health, and rehabilitation experiences and disparities.

OSP is a critical component of research capacity building efforts. OSP supports and advises the entire academic community in securing external support for sponsored projects (e.g., research) and collaborations. OSP is also responsible for assuring that submitted proposals conform to sponsor guidelines and applicable institutional policies and procedures. The goal of this capacity building consultation and Technical Assistance is to provide you (participants) with innovative tools that you can use to develop OSP best practices that are responsive to the needs of investigators, research sponsors, and your institution.

Participants:

This OSP capacity building consultation and TA activity targets OSP staff/administration and other stakeholders as determined by the institution.

Purpose of Protocol:

The purpose of this protocol is to provide a uniformed standard for the research capacity building science (intervention components) that can be applied to meetings across institutions to guide the OSP capacity building consultation and TA sessions. In short, the protocol is intended to standardize the OSP capacity

building consultation and TA interventions and facilitate a community-based action research approach. In this approach, interventions are introduced to the target institution or groups, observations are made, and based on these observations researchers determine the next best course of action such as what other intervention(s) needs to be provided, and whether to wax and wane the intervention.

Onsite Steps:

Materials potentially needed for the session: (Notepads and pencils, computer with presentation software, list of participants, markers, masking tape, name tags, refreshments, watch or clock, flip chart or easel paper, focus group script).

General Procedures and Guidelines

BEFORE THE SESSION

Identification of Participants: Name tents (if seating arrangement includes a table) or name tags (if seating arrangement is a circle without a table) will be used. The advantages of name tents or name tags include: (1) putting everyone on a first name basis, (2) allowing the moderator(s) to refer to participants by name, and (3) facilitating note-taking.

Arrival of Participants: All participants will be greeted as they arrive and engaged in small talk to make them feel more at ease. Instructions regarding refreshments will be provided.

DURING THE SESSION

The consultants will facilitate the discussion.

Introduction to Planning Meeting:

The introduction script, prepared in advance (see page 4), includes the introduction of the consultant(s) and the purpose/objectives of the meeting.

Introduction of Participants: To begin the meeting, have all the participants go around the room and introduce themselves. This introduction can include the participant's name, job position, and their expectations about the meeting.

Ground Rules

1. *We Want You to Do the Talking*: We would like everyone to participate. I may ask for your participation if I haven't heard from you in a while.
2. *There are No Right or Wrong Responses*: Every person's experiences and opinions are important. Please speak up whether you agree or disagree. We want to hear a wide range of opinions.
3. *What is Said in this Room Stays Here*: We want you to feel comfortable sharing when sensitive issues come up.

We'll start by asking you to tell us your name, and a little about your occupational position and following that we will follow today's agenda. Thank you.

Objectives:

- Define an OSP
- Discuss why OSP is critical to individual and institutional research capacity building at minority entities
- Provide participants with innovative tools they can use to develop OSP best practices

Sponsored Programs process	Description
SPO in the 21st Century University/College	• Role and function • Use of technology • Strategic planning • Human resource qualifications
Pre-Award	• Proposal development • Budget preparation • Proposal routing • Forms to be completed • Pre-award staff –training and qualifications
Post-Award	• Grant management • Forms to be completed • Billing and reporting • Preparing Federal research funding agency (e.g. NIDILL, NIH) progress reports • Post-Award Staff – training and qualifications
Training	• Policies and procedures - pertaining to sponsored projects • Developing Strong internal controls - processes that allow projects to achieve their mission • Federal guidance governing federal awards lifecycle – from the content of funding opportunities, proposal submission, award management, allowable costs, award close-out, to audit • Budget development • Cost share • Financial billing • Reporting • Administering direct expenses • Hiring policies • Administrative personnel training • PI Checklist
Contracts	• Conflict of interest (COI) • Subcontracts • Types of agreements • Contracts staff
Compliance	• Financial obligations • IRB obligations • Compliance contact/staff • Faculty communication about proposal changes
Incentives	• Incentives for faculty, students, and staff to write grants • Clear policies about incentives

We would like to thank each of you for taking the time to participate in our discussion and sharing your opinions. Your perspectives and views are very valuable to the future of your institution and the community at large. We greatly appreciate your honesty.

LANGSTON
UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Institutional Review Board (IRB) Consultation and Technical Assistance (TA) Protocol

[NAME OF INSTITUTION HERE]

Research Project 5:
The Minority-Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation

Research Team:
Dr. Corey L. Moore, Principal Investigator (PI)
Dr. Edward O. Manyibe, Co-Principal Investigator
Dr. Andre L. Washington, Co-Principal Investigator

Consultant/Facilitator:
[NAME OF CONSULTANT HERE]

Funding Agency:

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

Acknowledgement: The contents of this document were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RT5024-01-00). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this document do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the federal government.

Introduction Script:

Hello and thank you for agreeing to be part of the **Institutional Review Board (IRB) Capacity Building Training**. We appreciate your willingness to participate. I am ___[NAME OF CONSULTANT HERE],_ and I serve as Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities consultant. I will facilitate today's training. The reason we are having this meeting is to provide you with Institutional Review Board best practices. Currently the federal disability, independent living, health, and rehabilitation research enterprise lacks the "critical mass" of disability researchers from American Indian tribal colleges and universities, historically Black colleges and universities, and Hispanic serving institutions needed to lead federally sponsored R&D projects and to answer the large questions that policy makers, federal disability research enterprise leaders and staff, rehabilitation administrators and service providers, advocates, and persons with disabilities need answered. We have seen a drastic reduction in the number of disability research leaders from traditionally underrepresented populations, and there has been a decrease in the number of peer reviewed articles and other scholarly pieces examining and reporting on related multicultural rehabilitation issues. Consequently, there exists a void in the research literature, and this research gap must be addressed.

The small number of ME based faculty investigators engaging in disability and rehabilitation research indicates clearly that the voices of minorities may as well be silent when disability, independent living, health, and rehabilitation policies are formulated and implemented. Additionally, the way disability, independent living, health, and rehabilitation are defined, measured, and interpreted may not reflect the realities of people with disabilities from traditionally underrepresented populations. A critical need thus exist for research capacity building (RCB) interventions aimed at increasing both the number and quality of researchers from traditionally underrepresented racial and ethnic populations, to include those employed at minority entities available to study disability, independent living, health, and rehabilitation experiences and disparities.

The IRB is a critical component of research capacity building efforts. The IRB is an appropriately constituted committee that has been formally designated to review and monitor research involving human subjects. An IRB has the authority to approve, require modifications in (to secure approval), or disapprove research. The IRB review serves an important role in the protection of the rights and welfare of human research subjects. Thus, IRB must ensure that appropriate steps are taken to protect the rights and welfare of humans participating as subjects in the research. The goal of this capacity building training is to provide participants with innovative tools they can use to develop IRB best practices that give prompt but individualized attention to the numerous research projects at the institution.

Participants:

This IRB capacity building training workshop is open to faculty, staff, and students.

Purpose of Protocol:

The purpose of this protocol is to provide a uniformed standard for the research capacity building science (intervention components) that can be applied to meetings across institutions to guide the *IRB capacity*

building training sessions. In short, the protocol is intended to standardize the *IRB capacity building training* interventions and facilitate a community-based action research approach. In this approach, interventions are introduced to the target institution or groups, observations are made, and based on these observations researchers determine the next best course of action such as what other intervention(s) needs to be provided, and whether to wax and wane the intervention.

Onsite Steps:

Materials potentially needed for the session: (Notepads and pencils, computer with presentation software, list of participants, markers, masking tape, name tags, refreshments, watch or clock, flip chart or easel paper, focus group script).

General Procedures and Guidelines

BEFORE THE SESSION

Identification of Participants: Name tents (if seating arrangement includes a table) or name tags (if seating arrangement is a circle without a table) will be used. The advantages of name tents or name tags include: (1) putting everyone on a first name basis, (2) allowing the moderator(s) to refer to participants by name, and (3) facilitating note-taking.

Arrival of Participants: All participants will be greeted as they arrive and engaged in small talk to make them feel more at ease. Instructions regarding refreshments will be provided.

DURING THE SESSION

The consultants will facilitate the discussion.

Introduction to Planning Meeting:

The introduction script, prepared in advance (see page 4), includes the introduction of the consultant(s) and the purpose/objectives of the meeting.

Introduction of Participants: To begin the meeting, have all the participants go around the room and introduce themselves. This introduction can include the participant's name, job position, and their expectations about the meeting.

Ground Rules

1. *We Want You to Do the Talking*: We would like everyone to participate. I may ask for your participation if I haven't heard from you in a while.
2. *There are No Right or Wrong Responses*: Every person's experiences and opinions are important. Please speak up whether you agree or disagree. We want to hear a wide range of opinions.
3. *What is Said in this Room Stays Here*: We want you to feel comfortable sharing when sensitive issues come up.

We'll start by asking you to tell us your name, and a little about your occupational position and following that we will follow today's agenda. Thank you.

Objectives:

- Define an IRB
- Discuss why the IRB is critical to individual and institutional research capacity building at minority entities
- Provide participants with innovative tools they can use to develop IRB best practices

Institutional Review Board (IRB)	
Topic	**Areas of Focus**
Ethical Principles	• Nuremberg Code • Declaration of Helsinki • National Research Act • The Belmont Report
Institutional Review Board (IRB)	• Role and function • Use of technology • Strategic planning • Staff qualifications
Regulations and Policies	• Applicable Laws and Regulations • Compliance/noncompliance
Basic IRB Review	• Risk/benefit analysis • Informed consent • Selection of subjects • Privacy and confidentiality • Monitoring and observation • Additional safeguards • Incentives for participation • Continuing review
Considerations of Research Design	• Exemptions from IRB Review • Research methodology in biomedical research
Special Classes of Subjects	• Children and minors • Women • Cognitive impaired persons • Prisoners • Terminally ill patients • Elderly/aged persons • Minorities • Students, employees, and normal volunteers • International research
Communication with Key Constituents	• Principal Investigators (PI) • Co-PI • Faculty and staff • Students

We would like to thank each of you for taking the time to participate in our discussion and sharing your opinions. Your perspectives and views are very valuable to the future of your institution and the community at large. Once again, thank you.

LANGSTON UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Community of Practice Protocol

[NAME OF INSTITUTION HERE]

Research Project 5:
The Minority-Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation

Research Team:
Dr. Corey L. Moore, Principal Investigator (PI)
Dr. Edward O. Manyibe, Co-Principal Investigator
Dr. Andre L. Washington, Co-Principal Investigator

Consultant/Facilitator:
[NAME OF CONSULTANT HERE]

Funding Agency:

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

Acknowledgement: The contents of this document were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RT5024-01-00). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this document do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the federal government.

Introduction Script:

Hello and thank you for agreeing to be part of the Community of Practice (CoP) meeting. We appreciate your willingness to participate. I am __[NAME OF CONSULTANT HERE],__ and I serve as Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities consultant. I will facilitate today's *CoP meeting*. This meeting is sponsored through the LU-RRTC. Its mission is to improve Minority Serving Institution's (MSIs) disability and health research capacity and infrastructure by conducting a programmatic line of research examining experiences and outcomes of persons with disabilities from traditionally underserved racial and ethnic populations and communities and capacity-building efforts. The reason we are having this meeting is to communicate and share information and personal experiences in a way that builds our understanding of research dynamics, establish professional connections, and increase our research self-efficacy. Currently the federal disability, independent living, health, and rehabilitation research enterprise lacks the "critical mass" of disability and health researchers from American Indian tribal colleges and universities, historically Black colleges and universities, and Hispanic serving institutions needed to lead: (a) federally sponsored R&D projects and (b) to answer the large questions that policy makers, federal disability research enterprise leaders and staff, rehabilitation administrators and service providers, advocates, and persons with disabilities need answered. We have seen a drastic reduction in the number of disability and health research leaders from traditionally underrepresented populations. There has also been a decrease in the number of peer reviewed articles and other scholarly pieces examining and reporting on related multicultural rehabilitation issues. Consequently, there exists a void in the research literature, and this research gap must be addressed.

The small number of MSI-based faculty investigators engaging in disability and rehabilitation research indicates clearly that the voices of minorities may as well be silent when disability, independent living, health, and rehabilitation policies are formulated and implemented. Additionally, the way disability, independent living, health, and rehabilitation are defined, measured, and interpreted may not reflect the realities of people with disabilities from traditionally underrepresented populations. A critical need thus exist for increasing both the number and quality of researchers from traditionally underrepresented racial and ethnic populations, to include those employed at MSIs.

CoP is a critical component of our research capacity building efforts. CoP is a group of people bound by a shared interest, purpose, concern, or practice, who often collaborate to achieve individual or group objectives. The CoP is designed to allow community members to share ideas and knowledge through the use of e-portfolio. The LU-RRTC sponsored CoPs focus on providing Fellows a platform for sharing best practices and creating new knowledge to advance health and disability research aimed at eliminating access and outcomes disparities. The CoPs are based on the distributed intelligence framework and the theories of knowledge, which postulate that knowledge is a property passed by groups of people over time in shared practices and not a cognitive residue in the head of an individual.

Participants:

This CoP research capacity building intervention targets Fellows participating in the Peer-to-Peer Mentor Research Academy.

Purpose of Protocol

The purpose of this protocol is to provide a uniformed standard for the research capacity building science (intervention components) that can be applied to meetings across institutions to guide the CoP research capacity building sessions. In short, the protocol is intended to standardize the CoP capacity building interventions and facilitate a community-based action research approach. In this approach, interventions are introduced to the target institution or groups, observations are made, and based on these observations researchers determine the next best course of action such as what other intervention(s) needs to be provided, and whether to wax and wane the intervention.

Onsite Steps:

Materials potentially needed for the session: (Notepads and pencils, computer with presentation software, list of participants, markers, masking tape, name tags, refreshments, watch or clock, flip chart or easel paper, focus group script).

General Procedures and Guidelines

BEFORE THE SESSION

Identification of Participants: Name tents (if seating arrangement includes a table) or name tags (if seating arrangement is a circle without a table) will be used. The advantages of name tents or name tags include: (1) putting everyone on a first name basis, (2) allowing the moderator(s) to refer to participants by name, and (3) facilitating note-taking.

Arrival of Participants: All participants will be greeted as they arrive and engaged in small talk to make them feel more at ease. Instructions regarding refreshments will be provided.

DURING THE SESSION

The consultants will facilitate the discussion.

Introduction to Planning Meeting:

The introduction script, prepared in advance (see page 4), includes the introduction of the consultant(s) and the purpose/objectives of the meeting.

Introduction of Participants: To begin the meeting, have all the participants go around the room and introduce themselves. This introduction can include the participant's name, job position, and their expectations about the meeting.

Ground Rules

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3. *What is Said in this Room Stays Here*: We want you to feel comfortable sharing when sensitive issues come up.

We'll start by asking you to tell us your name, and a little about your occupational position and following that we will follow today's agenda. Thank you.

Objectives:

- Define a CoP
- Discuss why CoP is critical to individual and institutional research capacity building at minority entities
- Discuss opportunities and challenges for conducting health and disability research at minority serving Institutions
- Discuss strategies for overcoming barriers Fellows experience when conducting research

CoP Areas of Focus	Description
Define Community of Practice (CoP)	• What is Community of Practice • Theories • Technology and Communities of Practice
Importance of CoP	• Connect • Provide a shared context • Enable dialogue • Stimulate learning • Capture and diffuse existing knowledge • Introduce collaborative processes • Generate new knowledge
CoP and Research Capacity Building	• Define RCP • Discuss the relationship between RCB and CoP
Historically Black Colleges or Universities (HBCUs) Research Capacity Building	• Research environment • Research opportunities • Research barriers • Strategies to overcome barriers • Evidence-based strategies for improving access and outcomes among individuals with disabilities
American Indian Tribal Colleges or Universities (AITCUs)Research Capacity Building	• Research environment • Research opportunities • Research barriers • Strategies to overcome barriers • Evidence-based strategies for improving access and outcomes among individuals with disabilities
Hispanic Serving Institutions (HSIs) Research Capacity Building	• Research environment • Research opportunities • Research barriers • Strategies to overcome barriers • Evidence- based strategies for improving access and outcomes among individuals with disabilities
Research Productivity & CoPs	• Define research productivity • Identify elements of research productivity • Discuss strategies for increasing research productivity among community members

References:
Wenger, E. (2005). Communities of practice design guide: A step-by-step guide for designing & cultivating communities of practice in higher education. Retrieved from http://net.educause.edu/ir/library/pdf/nli0531.pdf

We would like to thank each of you for taking the time to participate in our discussion and sharing your opinions. Your perspectives and views are very valuable to the future of your institution and the community at large. We greatly appreciate your honesty.

LANGSTON UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Grant Writing Training and Consultation Protocol

[NAME OF INSTITUTION HERE]

Research Project 5:
The Minority-Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation

Research Team:
Dr. Corey L. Moore, Principal Investigator (PI)
Dr. Edward O. Manyibe, Co-Principal Investigator
Dr. Andre L. Washington, Co-Principal Investigator

Consultant/Facilitator:
[NAME OF CONSULTANT HERE]

Funding Agency:

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

Acknowledgement: The contents of this document were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RT5024-01-00). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this document do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the federal government.

Introduction Script:

Hello and thank you for agreeing to be part of the *Research Grant Writing Training and Consultation*. We appreciate your willingness to participate. I am ___[NAME OF CONSULTANT HERE],___and I serve as Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities consultant. I will facilitate today's *Research Grant Writing Training and Consultation*. The reason we are having this meeting is to provide you with basic grant writing knowledge and to inspire you to write and submit a federal research grant. Currently the federal disability, independent living, health, and rehabilitation research enterprise lacks the "critical mass" of disability researchers from American Indian tribal colleges and universities, historically Black colleges and universities, and Hispanic serving institutions needed to lead federally sponsored R&D projects and to answer the large questions that policy makers, federal disability research enterprise leaders and staff, rehabilitation administrators and service providers, advocates, and persons with disabilities need answered. We have seen a drastic reduction in the number of disability research leaders from traditionally underrepresented populations, and there has been a decrease in research examining and reporting on related multicultural rehabilitation issues. Consequently, there exists a void in the research literature, and this research gap must be addressed.

The small number of ME based faculty investigators engaging in disability and rehabilitation research indicates clearly that the voices of minorities may as well be silent when disability, independent living, health, and rehabilitation policies are formulated and implemented. Additionally, the way disability, independent living, health, and rehabilitation are defined, measured, and interpreted may not reflect the realities of people with disabilities from traditionally underrepresented populations. A critical need thus exist for increasing both the number and quality of researchers from traditionally underrepresented racial and ethnic populations, to include those employed at minority entities available to study disability, independent living, health, and rehabilitation experiences and disparities.

Grant Writing and Management:

The initial stage of any grant program is the most important. If a program is not well developed, it is difficult to adequately implement or monitor it. To form a sound foundation, grant programs should have clear and strong objectives prior to soliciting applications. Further, it is essential that all participants in the grant program share a common understanding of the program purpose. Implementing a project becomes difficult when key personnel have different interpretations of the purpose of the project.

Participants:

This grant writing and management training workshop is open to faculty, staff, and students.

Purpose of Protocol:

The purpose of this protocol is to provide a uniformed standard for the research capacity building science (intervention components) that can be applied to meetings across institutions to guide the grant writing and management training sessions. In short, the protocol is intended to standardize the grant writing and management training interventions and facilitate a community-based action research approach. In this approach, interventions are introduced to the target institution or groups, observations are made,

and based on these observations researchers determine the next best course of action such as what other intervention(s) needs to be provided, and whether to wax and wane the intervention.

Onsite Steps:

Materials potentially needed for the session: (Notepads and pencils, computer with presentation software, list of participants, markers, masking tape, name tags, refreshments, watch or clock, flip chart or easel paper, focus group script).

General Procedures and Guidelines

BEFORE THE SESSION

Identification of Participants: Name tents (if seating arrangement includes a table) or name tags (if seating arrangement is a circle without a table) will be used. The advantages of name tents or name tags include: (1) putting everyone on a first name basis, (2) allowing the moderator(s) to refer to participants by name, and (3) facilitating note-taking.

Arrival of Participants: All participants will be greeted as they arrive and engaged in small talk to make them feel more at ease. Instructions regarding refreshments will be provided.

DURING THE SESSION

The consultants will facilitate the discussion.

Introduction to Planning Meeting: The introduction script, prepared in advance (see page 4), includes the introduction of the consultant(s) and the purpose/objectives of the meeting.

Introduction of Participants: To begin the meeting, have all the participants go around the room and introduce themselves. This introduction can include the participant's name, job position, and their expectations about the meeting.

Ground Rules

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2. *There are No Right or Wrong Responses*: Every person's experiences and opinions are important. Please speak up whether you agree or disagree. We want to hear a wide range of opinions.
3. *What is Said in this Room Stays Here*: We want you to feel comfortable sharing when sensitive issues come up.

We'll start by asking you to tell us your name, and a little about your occupational position and following that we will follow today's agenda. Thank you.

Objectives:

- To provide hands-on experience in writing and managing federal grant proposals
- To inspire faculty, students, and staff based at minority entities to develop and apply for NIDRR and NIH grants

Grant writing process	Description
Preparing to Write Research Proposal	• Develop a checklist of the to-do-things • What information you need to know? • What organizational support is available? • Who can write you support letters?
The Funding Agency	• Know your funder – each funder has its mission and funding priorities
Putting together a research proposal development team	• Key personnel
Interpreting request for proposals (e.g. NIDILRR / NIH)	• Purpose, absolute priority, etc • Eligibility criteria • Page limit • Application deadline
Identifying proposal topic/need	• Developing compelling problem statement • Conducting comprehensive literature review
Goals and Objectives	• Stated succinctly • Objectives listed briefly and clearly
Methodology, Operations, or Procedures	• Describe how the project will be conducted • Research questions/hypotheses • Designing methodology
Resources and Personnel Available	• Facilities • Qualifications of key personnel • Partnerships • Identify institutional and human capital • Unique strengths
Budget	• Consider the costs of implementing a successful project
Proposal peer review Process	• Understanding the peer review process • Addressing evaluation criteria • Utilizing peer review feedback • Resubmitting proposals
Characteristics of Winning Grant Writers/Research Teams	• Resilient, persistent • Organized, time management

We would like to thank each of you for taking the time to participate in our discussion and sharing your opinions. Your perspectives and views are very valuable to the future of _[Name of Institution here)_ and the community at large. We greatly appreciate your honesty.

LANGSTON UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Manuscript Development Training Protocol

[NAME OF INSTITUTION HERE]

Research Project 5:
The Minority-Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation

Research Team:
Dr. Corey L. Moore, Principal Investigator (PI)
Dr. Edward O. Manyibe, Co-Principal Investigator
Dr. Andre L. Washington, Co-Principal Investigator

Consultant/Facilitator:
[NAME OF CONSULTANT HERE]

Funding Agency:

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

Acknowledgement: The contents of this document were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RT5024-01-00). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this document do not necessarily represent the policy of NIDILRR, ACL, HHS, and one should not assume endorsement by the federal government.

Introduction Script:

Hello and thank you for agreeing to be part of the *Manuscript Development Training and Consultation Workshop*. We appreciate your willingness to participate. I am __[NAME OF CONSULTANT HERE],___ and I serve as consultant for Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities. I will facilitate today's *Manuscript Development Training and Consultation Workshop*. The reason we are having this meeting is to provide you with hands-on experience in writing manuscripts and to inspire you to write for peer-reviewed journals. As you may be aware, investigators based at American Indian tribal colleges and universities, historically Black colleges and universities, and Hispanic serving institutions continue to under-participate in scientific publications. In addition, in the last few decades, we have also seen a drastic reduction in the number of peer reviewed articles and other scholarly products examining and reporting on related multicultural disability, independent living, health, and rehabilitation issues. Consequently, there exists a void in the research literature. Limited research productivity among faculty scholars at MEs, therefore, may contribute to ongoing health and rehabilitation disparities across racial and ethnic groups.

To meaningfully and holistically address clearly documented disparities (e.g., health and rehabilitation), a critical need exist for increasing both the number and quality of scientific publications from researchers from traditionally underrepresented racial and ethnic populations, to include those employed at minority entities. We believe that ME-based investigators' scholarly production is essential and can yield answers to questions worthy of scientific inquiry, particularly those with cultural nuance. These faculty scholars are uniquely qualified as research producers given their recognition of culture as a contextual central explanatory variable rather than a discrete variable that can only be manipulated and controlled.

To address the need for increasing scientific publications produced by minority serving institution-based faculty members, LU-RRTC is implementing a number of research capacity building activities at six minority entities, including [Name of Institution Here], that were selected to participate in the *Minority Serving Institution Research Capacity-Building and Infrastructure (IRCBIM) Model Evaluation*. IRCBIM activities are designed to enhance your disability, independent living, health, and rehabilitation research capacity. This training (i.e., *Manuscript Development Training and Consultation Workshop)* is particularly designed to provide you with hands-on experience in writing manuscripts and to inspire you to write for peer-reviewed journals. This training is designed to facilitate your successful preparation of manuscripts for publication.

Manuscript Writing and Publication

Manuscript preparation and publication is a foundation of scientific knowledge. In academia, the published manuscript is considered an indicator of future potential and current achievement. The importance of publications is highlighted by their central role in academic advancement (Holmes et al., 2009). Bringing to completion the hard work of one's research and sharing one's findings with the scientific community can bring personal rewards and prestige (APA, 2010). Moreover, it is through the continued communication of theoretical developments, high quality research, and discovery that the field of disability, independent

living, health, and rehabilitation science and application can advance. In addition, publications play an important role in improving the human condition, by examining potential solutions to problems such as rehabilitation and health disparities, unemployment, and research funding inequities.

Participants:

This Manuscript Writing Training and Consultation workshop is open to faculty, staff, and students. Participants with disabilities' access needs will be addressed by providing information via alternative formats upon request.

Purpose of Protocol:

The purpose of this protocol is to provide a uniformed standard for the research capacity building science (intervention components) that can be applied to meetings across institutions to guide the Manuscript Writing training workshops. In short, the protocol is intended to standardize the Manuscript Writing training interventions and facilitate a community-based action research approach. In this approach, interventions are introduced to the target institution or groups, observations are made, and based on these observations researchers determine the next best course of action such as what other intervention(s) needs to be provided, and whether to wax and wane the intervention.

Onsite Steps:

Materials potentially needed for the session: (Notepads and pencils, computer with presentation software, list of participants, markers, masking tape, name tags, refreshments, watch or clock, flip chart or easel paper, focus group script).

General Procedures and Guidelines

BEFORE THE SESSION

Identification of Participants: Name tents (if seating arrangement includes a table) or name tags (if seating arrangement is a circle without a table) will be used. The advantages of name tents or name tags include: (1) putting everyone on a first name basis, (2) allowing the moderator(s) to refer to participants by name, and (3) facilitating note-taking. The needs of participants with disabilities will be addressed via alternative access formats and accommodation mechanisms upon request.

Arrival of Participants: All participants will be greeted as they arrive and engaged in getting acquainted conversation to facilitate relaxing. Instructions regarding refreshments will be provided.

DURING THE SESSION

The consultants will facilitate the discussion.

Introduction to Planning Meeting: The introduction script, prepared in advance (see page 4), includes the introduction of the consultant(s) and the purpose/objectives of the meeting.

Introduction of Participants: To begin the meeting, all participants will provide self introductions. This introduction can include the participant's name, job position, and their expectations about the meeting.

Objectives:

- To provide hands-on experience in writing manuscripts
- To inspire faculty, students, and staff based at minority serving institutions entities to develop and submit research manuscripts for publication in peer reviewed journals

Ground Rules

1. *We Want You To Be an Active Participant:* I may ask for your participation if I have not heard from you in a while.
2. *There are No Right or Wrong Responses*: Every person's experiences and opinions are important. Please speak up whether you agree or disagree. We want to hear a wide range of opinions.
3. *What is Said in this Room Stays Here*: We want you to feel comfortable sharing when sensitive issues are shared.

We'll start by asking you to tell us your name, and a little about your occupational position and following that we will follow today's agenda. Thank you.

Manuscript writing process	Description
Types of Manuscripts	• Original scientific articles • Literature reviews and editorials • Case reports, etc
Cover Letter	• The manuscript title and authors. • A concise statement of why this manuscript is important. • The fact that the article is not under review by any other journal • The declaration that this is original work and that all authors have participated. • The submission of any conflict of interest by the coauthors
Title and Abstract	• Clearly reflects content of the manuscript • Creative and attractive
Introduction	• Establishes current knowledge in the field • Clearly summarizes previous knowledge • Sets the stage for the present study
Literature Review	• Systematic • Current- up-to-date
Research Questions/Hypotheses	• Formulate testable hypotheses
Method	• Appropriateness and validity of methods • Methods of sampling • Instrumentation • Get access to a data set/data collection procedures • Analytic software/data analysis
Results and Discussion	• Summarizes collection of data and analysis • Evaluation and interpretation of findings
Selecting Journal for Submission	• Appropriateness to the topic • Determine publication cycle • Determine style of writing (e.g., APA/Orientation to APA Manual) • Editorial board members and conflict of interest, if any.

Characteristics of a Strong Manuscript	• Adequate review of the literature, appropriate citations, clear introduction, clear research questions/hypotheses, adequately described sample, sufficient methodology, completely described measures, clear statistical analysis, appropriate statistical techniques, etc
Characteristics of Successful Writers (Demystifying manuscript writing)	• Resilient, persistent, organized, good at time management, professional networking, teamwork, etc
Ethical Considerations	• Institutional Review Board (IRB) approval • Confidentiality
Why Publish?	• "Publish or Perish" • Contribute new knowledge • Influence and prestige, etc

Conclusion

We would like to thank each of you for taking the time to participate in this training.

References:

American Psychological Association (2010). Preparing manuscripts for publication in psychology journals: A guide for new authors. Retrieved from http://www.apa.org/pubs/authors/new-author-guide.pdf.

Holmes, D. R., Hodgson, P. K., Nishimura, R. A., & Simari, R.D. (2009). Careers in Cardiovascular Research: Manuscript Preparation and Publication. Circulation, 120:906-91

APPENDIX B
Data Collection Instruments and Protocols

LANGSTON UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Academy Fellows Research Capacity Building Needs Assessment Survey

Principal Investigator (PI): Dr. Corey L. Moore, CRC

*****To be completed by Research Fellows Only*****

The objectives of the following questions are (a) to obtain information on the knowledge, experience, skills, and attitudes of Research Fellows participating in the Peer-to-Peer Mentor Research Team Academy and (b) to identify disability and rehabilitation research skill capacity building and infrastructure needs.

Instructions:
This survey consists of four (4) sections (A, B, C, D). Each section consists of a number of closed-ended and open-ended questions. Please complete all the questions to reflect your opinions as accurately as possible. Your information will be kept strictly confidential.

SECTION A

SECTION A: For close-ended questions use the scale below and select the term that best describes the disability and rehabilitation research capacity of your institution:

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

A - 1: Leadership

***1)** The monetary reward system at your institution matches your personal and/or institution's research vision and goals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- 4) = Usually True
- (5) = Almost Always True

***2)** My institution has systematic and fair mechanisms for recognizing and celebrating faculty members' research achievements.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

***3)** What does your institution need to have established that would enhance its research capacity?

*4) A large portion of my academic department's faculty can be considered to be productive in research (e.g., publish peer-reviewed articles, secure research grants).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*5) My department head is highly regarded for his/her research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*6) Please comment on any Research Culture Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*7) My institution has a clear strategic plan that promotes research capacity building and infrastructure development.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*8) My institution maintains databases of both successful and unsuccessful applications for funding, along with information that could help future applications to specific funders.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*9) Please comment on any Strategic Planning Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*10) My institution allocates adequate resources (e.g., research seed and start-up funds) for professional development in disability and rehabilitation research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*12) My institution regularly offers trainings on research methods and/or grant writing skills development.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*13) Please comment on any Internal Training Opportunities that you think may be relevant to building research capacity and infrastructure at your institution.

A - 2: Structure

*14) I consider my sponsored programs office effective in supporting research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*15) I consider my institution's research financial management system as effective in achieving research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*16) I consider my institution's information technology (IT) management and support system as effective in supporting research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*17) I consider my institution's Institutional Review Board (IRB) system as effective in supporting research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*18) Please comment on any Research Support Systems that you think may be relevant to building research capacity and infrastructure at your institution.

*19) My institution's research support office (sponsored programs) consists of qualified personnel who provide adequate support to faculty researchers.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*20) Faculty scholars at my institution have adequate research support staff (e.g., secretarial support, research assistants).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*21) Please comment on any Human Resources/Staffing that you think may be relevant to building research capacity and infrastructure at your institution.

*22) My teaching, advising, and service commitments allow me ample time to conduct research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*23) Please comment on any Faculty Role & Function Needs that you think may be relevant to building research capacity and infrastructure at your institution.

A - 3: Collaboration

*24) My institution has well developed research partnerships with other USA institutions.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*25) My institution has well developed research partnerships with institutions outside the USA.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*26) My institution has a protocol for conducting international research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*27) Please comment on any National and International Collaboration Needs that you think may be relevant to building disability and rehabilitation research capacity and infrastructure at your institution.

A - 4: External Support

*28) My institution regularly receives federal research funding (e.g., NIDRR, NIH).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*29) Federal Research capacity building fellowships are usually available to faculty members at my institution.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*30) I regularly serve as a federal grant proposal review panelist.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*31) I have sufficient opportunities to lead federally funded disability and rehabilitation research projects.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*32) Faculty members from my institution usually have opportunities to serve on federal research entity (e.g., NIDRR, NIH) advisory committees or related bodies.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*33) Federal disability research entities publication of minority entity research capacity building (RCB) request for proposals (RFPs) and associated priorities are sufficient.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*34) Please comment on any Federal Research Funding Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*35) My institution regularly receives private research funding (e.g., from businesses and non-governmental organizations such as Robert Wood Johnson Foundation and Bill & Melinda Gates Foundation) to conduct disability research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*36) Please comment on any Private Research Funding Needs that you think may be relevant to building research capacity and infrastructure at your institution.

A - 5: Access to Resources

*37) I have adequate access to technological resources such as computers and research software (e.g., SPSS, SAS, NVivo) to conduct my research projects.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*38) Overall, the Informational Technology (IT) department is responsive to my research technological support needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*39) Please comment on any Research Technology Resources Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*40) My institution provides adequate research training opportunities (e.g., training to use research software).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*41) My institution has a faculty development support scheme to facilitate faculty participation in conferences.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*42) Please comment on any Access to Training Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*43) My institution has a formal research mentoring program for faculty in my department.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*44) I have an "unassigned" mentor(s) either in this department or in other departments/schools/organizations who provides me with valuable guidance in research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*45) Please comment on any Mentoring Needs that you think may be relevant to building disability and rehabilitation research capacity and infrastructure at your institution.

SECTION B

SECTION B: For close-ended questions, use the scale below and select the term that best describes your personal disability and rehabilitation research capacity:

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True,* 5 = *Almost Always True.

B - 1: Research Network

*46) I have a well-developed interdisciplinary research network, particularly in areas related to disability and rehabilitation.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*47) I have a well-developed network of colleagues in the department with whom one can discuss disability and rehabilitation research projects.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*48) I regularly serve as a peer reviewer for academic journals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*49) Please comment on any Engagement With Research Actors Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*50) I make research presentations (including poster presentations) at research conferences at least once a year.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*51) Please comment on any Membership and Participation in Professional Organizations or Research Networks Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 2: Skill & Knowledge

*52) I believe I am currently "up-to-date" in Research skills in my area (e.g., statistics, research design, data collection and analysis using statistical software, data management).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*53) I believe I am currently "up-to-date" in Writing skills (e.g., identifying appropriate outlet/audience, constructing concise/persuasive text.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*54) I am confident in my ability to effectively manage a grant (e.g., budget, building internal relationships, executing grant activities).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*55) Please comment on Research Skill and Knowledge Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*56) I believe I am currently "up-to-date" in research grant-procurement skills in my area (e.g., interpreting request ffor proposals, identifying funding sources, preparing grants, using research reviews).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*57) Please comment on Any Research Grant Writing and Management Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 3: Ongoing Learning

*58) I stay very "up-to-date" on the current literature in my research interest area(s).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*59) My academic department provides me with adequate support to travel to research-based conferences.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*60) Please comment on any Research Skills Development Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*61) I would describe myself as being internally driven to conduct disability and rehabilitation research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*62) I would describe myself as being externally driven to conduct rehabilitation research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*63) Please comment on any issues related to Motivation that you think may be relevant to building research capacity and infrastructure at your institution.

*64) I have authored or co-authored research publications in the past 2 years.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*65) I have excellent opportunities to pursue my interests in disability and rehabilitation research at my institution.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*66) Please comment on any Self-Efficacy Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 4: Participation

*67) I have a well-defined plan for achieving my academic career goals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*68) I see myself as a disability and rehabilitation researcher.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*69) Please comment on any Professional Identity Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*70) My career goal is to become a highly regarded disability and rehabilitation researcher.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*71) Please comment on any Commitment Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 5: Psychological Well-Being

*72) My department head is very supportive of my efforts in research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*73) I get constructive feedback, guidance and suggestions from my department colleagues that help me perform my best.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*74) Colleagues in my department are open to collaborating on research opportunities.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*75) Please comment on any Collegiality Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*76) I feel overwhelmed by research requirements at my institution.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*77) I am good at managing research related stress.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*78) I am able to manage existing competing factors (e.g., family, friends, time) to conducting research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*79) Please comment on any Stress and Coping Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*80) I have adequate space to conduct my research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*81) The skills, expertise, and experience of faculty in my department are appropriate to accomplish our research goals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*82) I feel appreciated and valued by my local colleagues (departments/school/university) for my work in research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*83) Please comment on any Research Environment Needs that you think may be relevant to building research capacity and infrastructure at your institution.

SECTION C

SECTION C: Please rate the importance of the following research skills and knowledge training needs to your overall research development using the scale below:

1 = Very Important, 2 = Important, 3 = Moderately Important, 4 = Of Little Importance, 5 = Unimportant.

***84)** Conducting a Research Needs Assessment:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***85)** Identifying Research Questions:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***86)** Defining Research Instruments:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***87)** Piloting Research Instrument:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***88)** Conducting Qualitative Studies (E.G., Focus Groups, In-Depth Interviews, Ethnographic Methods):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*89) Conducting Mixed-Methods Research:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*90) Advanced Quantitative Research:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*91) Advanced Statistics:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*92) Utilizing Large Databases (e.g., RSA 911 Data) For Research:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*93) Data Collection & Analysis:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*94) Reviewing Manuscripts:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*95) Use of Statistical Software (e.g., SPSS) For Data Analysis:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*96) Use of Reference management Software Package (e.g., EndNote):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*97) Manuscript Development & publication process:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*98) Participating in Journal Editorial Boards (e.g., Rehabilitation Counselling Bulletin , Journal of the National Medical Association):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*99) Putting together Research Proposal Development Team:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*100) Research proposal development Mechanics:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***101)** Interpreting Request For Proposals (e.g., NIDRR's RFP):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***102)** Developing research networks and partnerships:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***103)** Becoming a Proposal Peer Reviewer with federal research funding agencies (e.g., NIDRR, NHI):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***104)** Post-award grant management:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

SECTION C: Using the scale below, please rate your satisfaction with the identified resources of your institution:

1 = Extremely Satisfied, 2 = Very Satisfied, 3 = Moderately Satisfied, 4 = Slightly Satisfied, 5 = *Not at all satisfied.*

***105)** Access to personal computers (e.g. laptops):

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*106) Availability of research assistants:

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*107) Up-to-date Reference Management Software Package (e.g., EndNote):

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*108) Up-to-date Statistical Software (e.g., SPSS, SAS, NVivo) For Data Analysis:

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*109) Adequate Office Space:

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*110) Availability of research mentor(s):

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

SECTION D

SECTION D: The following questions are for classifying your responses with those of others in the survey.

*111) Name:

*112) What is your current Title and Rank? (if faculty member)

*113) Department/School:

*114) Name of Institution:

*115) How long have you worked in your current job? (Indicate in years)

*116) Gender

- Male
- Female

*117) Race/Ethnicity:

- Black/African American
- Asian
- Hispanic or Latino
- White
- American Indian or Alaska Native
- Native Hawaiian and Other Pacific Islander
- Other (please specify)

*118) What is your current martial status?

- Single, never married
- Married
- Living with someone n a marriage-like relationship
- Separated
- Divorced
- Widowed

*119) Are you a person with a disability?

- Yes
- No

*120) Are you a citizen of the United States?

- Yes
- No

*121) If you answered "No" to the previous questions, do you have permanent resident alien status?

- NA- I answered "Yes" to the previous question
- Yes
- No

*122) On average, how many students do you advise per semester? (Indicate with numeric value, example 30)

*123) On average, how many hours do you teach per week? (Indicate with numeric value, example 12)

*124) How many on-campus committees are you involved in? (Indicate with numeric value, example 4)

*125) How many off-campus committees are you involved in? (Indicate with numeric value, example 9)

These are all the questions we have for you. Thank you for your time and thoughtful response. If you have any questions or comments, please e-mail the Research Analyst and Survey Manager Dr. Andre Washington at capacitybuildingrrtc@langston.edu

Thank you!

LANGSTON UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Administrators/Staff, Students, and Faculty Scholoars Research Capacity Building Needs Assessment Survey

Principal Investigator (PI): Dr. Corey L. Moore, CRC

We are very pleased to have your institution represented as one (1) of the six (6) minority serving institutions selected to participate in the Institutional Research Capacity Building Infrastructure Model (IRCBIM), which is sponsored by the Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities. As part of IRCBIM, LU-RRTC provides a variety of technical assistance services to improve the research capacity and infrastructure of participating institutions. Thus, we are asking you to complete this short survey to help us customize our technical assistance to your institution. The survey should take no more than 15 minutes to complete. Your response to this survey will be confidential. Thank you for your participation.

The questionnaire contains five sections. Section 1 (Demographics) seeks some background information about you. Section 2 focus on research infrastructure and Section 3-5 focuses on research skills training; grant writing, and leadership training needs. For each question please pick the appropriate response or write a response in the space provided.

Section One

Demographics

*1) Which type of university are you currently located at:

- ○ Historical Black College and University (HBCU)
- ○ American Indian Tribal College and University (AITCU)
- ○ Hispanic Serving Institution (HSI)

*2) Please indicate your current status at your university:

- ○ Administration/Staff
- ○ Faculty
- ○ Student

Question Logic
If **[Administration/Staff]** is selected, then skip to question **[#4]**
If **[Faculty]** is selected, then skip to question **[#4]**
If **[Student]** is selected, then skip to question **[#3]**

*3) Please indicate your current classification below:

- ◯ Freshman
- ◯ Sophomore
- ◯ Junior
- ◯ Senior
- ◯ Graduate Student
- ◯ Post Graduate Student (i.e. Doctoral Program)

Question Logic
If **[Freshman]** is selected, then skip to question **[#6]**
If **[Sophomore]** is selected, then skip to question **[#6]**
If **[Junior]** is selected, then skip to question **[#6]**
If **[Senior]** is selected, then skip to question **[#6]**
If **[Graduate Student]** is selected, then skip to question **[#6]**
If **[Post Graduate Student (i.e. Doctoral Program)...]** is selected, then skip to question **[#6]**

*4) What is your current position/title and Rank:

*5) How long have you worked in your current job? (Indicate in years)

*6) Gender:

- ◯ Male
- ◯ Female

*7) Race/Ethnicity:

- ◯ Black/African American
- ◯ Asian
- ◯ Hispanic or Latino
- ◯ White
- ◯ American Indian or Alaska Native
- ◯ Native Hawaiian and Other Pacific Islander
- ◯ Other (please specify)

*8) Are you a person with a disability?

- ◯ Yes
- ◯ No [

Section Two
Research Infrastructure

*9) My institution needs a strategic plan that guides and promotes research capacity building and infrastructure development for faculty, staff, and students (e.g. programs for students to conduct and present research at local/regional/national conferences).

- ◯ 1 = Strongly Disagree
- ◯ 2 = Disagree
- ◯ 3 = No Opinion or Uncertain
- ◯ 4 = Agree
- ◯ 5 = Strongly Agree

*10) My institution's sponsored programs office needs technical assistance to be more effective in supporting the community faculty, staff, and students conduct research and write or manage research grants.

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = No Opinion or Uncertain
- 4 = Agree
- 5 = Strongly Agree

*11) My institution's Institutional Review Board (IRB) system needs technical assistance to be more effective in supporting faculty, staff, students) conduct research and write or manage research grants.

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = No Opinion or Uncertain
- 4 = Agree
- 5 = Strongly Agree

*12) My institution's technological resources such computers and research software (e.g., SPSS, SAS, NVivo) are adequate.

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = No Opinion or Uncertain
- 4 = Agree
- 5 = Strongly Agree

13) Please list any specific training needed to improve your institution's research infrastructure.

Section Three
Research Skills Training

Instructions:

Please rate the importance of providing the following research related trainings at your institution.

1 = Very Important, 2= Important, 3 = Moderately Important, 4 = Of little Importance, 5 = Unimportant

*14) How important is the need for Quantitative Research Design training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*15) How important is the need for Qualitative Research Design training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*16) How important is the need for Best Practices in Cross-Cultural Research training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*17) How important is the need for Qualitative Data analysis using NVivo training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*18) How important is the need for Quantitative Data analysis using IBM SPSS Statistics (formerly SPSS Statistics) training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*19) How important is the need for Conducting Effective Literature Reviews training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*20) How important is the need for Students-faculty research collaboration training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

*21) How important is the need for Manuscript development and peer review publication process training at your institution?

- 1 = Very Important
- 2= Important
- 3 = Moderately Important
- 4 = Of little Importance
- 5 = Unimportant

22) Please list any specific training you need to improve your research skills.

Section Four
Grant Writing

***23)** How important is the need for Grant writing and management training at your institution?

- ○ 1 = Very Important
- ○ 2= Important
- ○ 3 = Moderately Important
- ○ 4 = Of little Importance
- ○ 5 = Unimportant

***24)** How important is the need to have a training on how to develop a working relationships with Federal grant Funding agencies (e.g. NIDILRR, NIH) at your institution?

- ○ 1 = Very Important
- ○ 2= Important
- ○ 3 = Moderately Important
- ○ 4 = Of little Importance
- ○ 5 = Unimportant

***25)** How important is the need for understanding "behind-the-scenes" decisions that determine proposal acceptance and denial training at your institution?

- ○ 1 = Very Important
- ○ 2= Important
- ○ 3 = Moderately Important
- ○ 4 = Of little Importance
- ○ 5 = Unimportant

***26)** Please list any specific training you need to improve your grant writing and management skills.

Section Five
Research Leadership Development

***27)** How important is the need for Collaborative Research and Effective Research Teams training at your institution?

- ○ 1 = Very Important
- ○ 2= Important
- ○ 3 = Moderately Important
- ○ 4 = Of little Importance
- ○ 5 = Unimportant

***28)** How important is the need for Time management (i.e., balancing teaching, research, service, and personal commitments) training at your institution?

- ○ 1 = Very Important
- ○ 2= Important
- ○ 3 = Moderately Important
- ○ 4 = Of little Importance
- ○ 5 = Unimportant

29) Please list any specific training you need to improve your leadership skills.

These are all the questions we have for you. Thank you for your time and thoughtful response. If you have any questions or comments, please e-mail the Research Analyst and Survey Manager Dr. Andre Washington at capacitybuildingrrtc@langston.edu

Thank you!

LANGSTON
UNIVERSITY

Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Minority-Serving Institution Research Capacity Building and Infrastructure Model [IRCBIM] Evaluation Survey

Principal Investigator: Dr. Corey L. Moore, CRC

Co-Principal Investigator: Dr. Edward O. Manyibe, CRC

Dear Rehabilitation Professional,

You are invited to participate in a research study titled **"Minority-Serving Institution Research Capacity Building and Infrastructure Model [IRCBIM] Evaluation Survey"** You are selected as a potential participant because you have been identified as an administrator, staff, faculty, or student at an institution currently participating in the implimentation of the **Institutional Research Capacity-Building and Infrastructure (IRCBIM) *Model***. IRCBIM is an emerging innovative and integrated approach designed to build, strengthen, and sustain adequate research capacity (i.e., research infrastructure and investigators' research skills) at minority-serving institutions. A Minority Serving Institution/Minority Entity is defined in Section 21(b)(2)(A) of the Rehabilitation Act Amendments as a historically black college or university (a part B institution, as defined in section 322(2) of the Higher Education Act of 1965, as amended), a Hispanic-serving institution of higher education, an American Indian tribal college or university, or another institution of higher education whose minority student enrollment is at least 50 percent. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Purpose
The purpose of this study is to evaluate the implementation of the Institutional Research Capacity-Building and Infrastructure (IRCBIM) Model at your institution. In this study, you will be asked to complete an electronic survey.

Procedures
If you agree to participate, you will complete a number of survey questions related to the implementation of the Institutional Research Capacity-Building and Infrastructure (IRCBIM) Model at your institution. In addition, you will be asked to complete a few demographic questions. The survey will take about 30 minutes to complete.

Informed Consent

I understand and agree to the following conditions regarding my voluntary participation in the research:

My responses to the survey questions and my discussion of relevant issues will be anonymous to all parties outside of the key project members and will be treated with complete confidentiality.

My responses will be collected and placed in a locked file, where they will remain until analyzed by Dr. Corey L. Moore and research team. No one else will see my input data, and that data will be secured by Dr. Corey L. Moore and research team at all times.

The data yielded from this research will be used solely for research.

No procedures are experimental or involve any risk to participants which are greater than those ordinarily encountered in daily life.

Names of participants will be used solely to verify participation and allow follow-up contact to increase participation.

This survey is conducted electronically and is submitted anonymously. Privacy is achieved by using the psychdata.com on-line survey website where participants can respond to the survey without disclosure. The principal investigator of the research is Dr. Corey L. Moore. Questions regarding this research should be directed to Dr. Corey L. Moore, at clmoore@langston.edu or 405.530.7530. This project has been approved by the Institutional Review Board (IRB) at Langston University. If you have any questions about your rights as a research study participant, you may contact the chair of the IRB, Dr. D. Chongo Mundende, at 405.466.3456 or dcmundende@langton,edu.

***1)** Statement of Consent: By selecting "YES" and completing and submitting this survey, I confirm that I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that my participation in this online survey is voluntary, that there is no penalty for declining participation, and that I am free to withdraw my consent at any time.

- ○ Yes - Continue with survey
- ○ No- End survey now

Question Logic
If **[Yes - Continue with survey...]** is selected, then skip to question **[after #1, Text]** (See "Edit Logic" for details)
If **[No- End survey now]** is selected, then skip to question **[GO TO END OF SURVEY]**

***2)** Name:

***3)** Department/School:

***4)** Name of Institution:

*5) Gender

- Male
- Female

*6) Are you a person with a disability?

- Yes
- No

*7) Race/Ethnicity:

- Black/African American
- Asian
- Hispanic or Latino
- White
- American Indian or Alaska Native
- Native Hawaiian and Other Pacific Islander
- Other (please specify)

*8) What is your current martial status?

- Single, never married
- Married
- Living with someone n a marriage-like relationship
- Separated
- Divorced
- Widowed

*9) Are you a citizen of the United States?

- Yes
- No

*10) If you answered "No" to the previous questions, do you have permanent resident alien status?

- NA- I answered "Yes" to the previous question
- Yes
- No

Instructions:

Please evaluate the extent to which you agree with the statements below using the following scale:
Strongly Disagree, Disagree, No Opinion, Agree, Strongly Agree.

*11) My institution needs a strategic plan that guides and promotes research capacity building and infrastructure development for faculty, staff, and students (e.g. programs for students to conduct and present research at local/regional/national conferences).

- Strongly Disagree
- Disagree
- No Opinion or Uncertain
- Agree
- Strongly Agree

*12) My institution's sponsored programs office needs technical assistance to be more effective in supporting faculty, staff, and students conduct research and write or manage research grants.

- Strongly Disagree
- Disagree
- No Opinion or Uncertain
- Agree
- Strongly Agree

*13) My institution's Institutional Review Board (IRB) system needs technical assistance to be more effective in supporting faculty, staff, and students to conduct research and write or manage research grants

- Strongly Disagree
- Disagree
- No Opinion or Uncertain
- Agree
- Strongly Agree

*14) My institution's technological resources such computers and research software (e.g., SPSS, SAS, NVivo) are adequate.

- Strongly Disagree
- Disagree
- No Opinion or Uncertain
- Agree
- Strongly Agree

15) Please list any specific training needed to improve your institution's research infrastructure.

Instructions:

Please rate the importance of providing research related trainings below using the following scale:
Very Important, Important, Moderately Important, Unimportant.

*16) How important is the need for Quantitative Research Design training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*17) How important is the need for Qualitative Research Design training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*18) How important is the need for Best Practices in Cross-Cultural Research training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*19) How important is the need for Qualitative Data analysis using NVivo training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*20) How important is the need for Quantitative Data analysis using IBM SPSS Statistics (formerly SPSS Statistics) training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*21) How important is the need for Conducting Effective Literature Reviews training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*22) How important is the need for Students-faculty research collaboration training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

*23) How important is the need for Manuscript development and peer review publication process training at your institution?

- Very Important
- Important
- Moderately Important
- Of Little Importance
- Unimportant

24) Please list any specific training you need to improve your research skills.

Instructions:

Please rate the importance of providing grant writing and management related trainings below using the following scale:
Very Important, Important, Moderately Important, Unimportant

***25)** How important is the need for Grant writing and management training at your institution?

- ○ Very Important
- ○ Important
- ○ Moderately Important
- ○ Of Little Importance
- ○ Unimportant

***26)** How important is the need to have a training on how to develop a working relationships with Federal grant Funding agencies (e.g. NIDILRR, NIH) at your institution?

- ○ Very Important
- ○ Important
- ○ Moderately Important
- ○ Of Little Importance
- ○ Unimportant

***27)** How important is the need for understanding "behind-the-scenes" decisions that determine proposal acceptance and denial training at your institution?

- ○ Very Important
- ○ Important
- ○ Moderately Important
- ○ Of Little Importance
- ○ Unimportant

28) Please list any specific training you need to improve your grant writing and management skills.

Instructions:

Please rate the importance of providing the trainings below using the following scale:
Very Important, Important, Moderately Important, Unimportant

***29)** How important is the need for Collaborative Research and Effective Research Teams training at your institution?

- ○ Very Important
- ○ Important
- ○ Moderately Important
- ○ Of Little Importance
- ○ Unimportant

***30)** How important is the need for Time management (i.e., balancing teaching, research, service, and personal commitments) training at your institution

- ○ Very Important
- ○ Important
- ○ Moderately Important
- ○ Of Little Importance
- ○ Unimportant

31) Please list any specific training you need to improve your leadership skills.

***32)** Please choose the category below that you identify with the most:

- ○ Faculty
- ○ Administrator/Staff
- ○ Student

Question Logic
If **[Faculty]** is selected, then skip to question **[No logic applied]**
If **[Administrator/Staff]** is selected, then skip to question **[GO TO END OF SURVEY]**
If **[Student]** is selected, then skip to question **[GO TO END OF SURVEY]**

Instructions:

Please use the scale below and select the response that best describes the incentives for conducting reseearch at your institution.

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True,* 5 = *Almost Always True.

A - 1: Leadership

***33)** The monetary reward system at your institution matches your personal and/or institution's research vision and goals.

- ○ (1) = Almost Never True
- ○ (2) = Usually Not True
- ○ (3) = Occasionally True
- ○ 4) = Usually True
- ○ (5) = Almost Always True

***34)** My institution has systematic and fair mechanisms for recognizing and celebrating faculty members' research achievements.

- ○ (1) = Almost Never True
- ○ (2) = Usually Not True
- ○ (3) = Occasionally True
- ○ (4) = Usually True
- ○ (5) = Almost Always True

***35)** What does your institution need to have established that would enhance its research capacity?

Instructions:

Please use the scale below and select the response that best describes your department's research productivity.
1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True,* 5 = *Almost Always True.

***36)** A large portion of my academic department's faculty can be considered to be productive in research (e.g., publish peer-reviewed articles, secure research grants).

- ○ (1) = Almost Never True
- ○ (2) = Usually Not True
- ○ (3) = Occasionally True
- ○ (4) = Usually True
- ○ (5) = Almost Always True

*37) My department head is highly regarded for his/her research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*38) Please comment on any Research Culture Needs that you think may be relevant to building research capacity and infrastructure at your institution.

Instructions:

Please use the scale below and select the response that best describes your institutions research infrastructure.
1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

*39) My institution has a clear strategic plan that promotes research capacity building and infrastructure development.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*40) My institution maintains databases of both successful and unsuccessful applications for funding, along with information that could help future applications to specific funders.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*41) Please comment on any Strategic Planning Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*42) My institution allocates adequate resources (e.g., research seed and start-up funds) for professional development in disability and rehabilitation research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*43) Please comment on any Intellectual Capital and Investment in Research that you think may be relevant to building research capacity and infrastructure at your institution.

*44) My institution regularly offers trainings on research methods and/or grant writing skills development.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*45) Please comment on any Internal Training Opportunities that you think may be relevant to building research capacity and infrastructure at your institution.

*46) I consider my sponsored programs office effective in supporting research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*47) I consider my institution's research financial management system as effective in achieving research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*48) I consider my institution's information technology (IT) management and support system as effective in supporting research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*49) I consider my institution's Institutional Review Board (IRB) system as effective in supporting research and grant management needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*50) Please comment on any Research Support Systems that you think may be relevant to building research capacity and infrastructure at your institution.

*51) My institution's research support office (sponsored programs) consists of qualified personnel who provide adequate support to faculty researchers.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*52) Faculty scholars at my institution have adequate research support staff (e.g., secretarial support, research assistants).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*53) Please comment on any Human Resources/Staffing that you think may be relevant to building research capacity and infrastructure at your institution.

*54) My teaching, advising, and service commitments allow me ample time to conduct research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*55) Please comment on any Faculty Role & Function Needs that you think may be relevant to building research capacity and infrastructure at your institution.

A - 3: Collaboration

Instructions:

Please use the scale below and select the response that best describes the level of reseasrch collaboration at your institution.
1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

*56) My institution has well developed research partnerships with other USA institutions.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*57) My institution has well developed research partnerships with institutions outside the USA.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*58) My institution has a protocol for conducting international research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*59) Please comment on any National and International Collaboration Needs that you think may be relevant to building disability and rehabilitation research capacity and infrastructure at your institution.

A - 4: External Support

Instructions:

Please use the scale below and select the response that best describes the level of reseasrch collaboration at your institution.
1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

*60) My institution regularly receives federal research funding (e.g., NIDRR, NIH).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*61) Federal Research capacity building fellowships are usually available to faculty members at my institution.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*62) I regularly serve as a federal grant proposal review panelist.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*63) I have sufficient opportunities to lead federally funded disability and rehabilitation research projects.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*64) Faculty members from my institution usually have opportunities to serve on federal research entity (e.g., NIDRR, NIH) advisory committees or related bodies.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*65) Federal disability research entities publication of minority entity research capacity building (RCB) request for proposals (RFPs) and associated priorities are sufficient.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*66) Please comment on any Federal Research Funding Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*67) My institution regularly receives private research funding (e.g., from businesses and non-governmental organizations such as Robert Wood Johnson Foundation and Bill & Melinda Gates Foundation) to conduct disability research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*68) Please comment on any Private Research Funding Needs that you think may be relevant to building research capacity and infrastructure at your institution.

A - 5: Access to Resources

Instructions:

Please use the scale below and select the response that best describes aceess to resources for conducting research at your institution.

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

***69)** I have adequate access to technological resources such as computers and research software (e.g., SPSS, SAS, NVivo) to conduct my research projects.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

***70)** Overall, the Informational Technology (IT) department is responsive to my research technological support needs.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

***71)** Please comment on any Research Technology Resources needs that you think may be relevant to building research capacity and infrastructure at your institution.

***72)** My institution provides adequate research training opportunities (e.g., training to use research software).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

***73)** My institution has a faculty development support scheme to facilitate faculty participation in conferences.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

***74)** Please comment on any Access to Training Needs that you think may be relevant to building research capacity and infrastructure at your institution.

***75)** My institution has a formal research mentoring program for faculty in my department.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*76) I have an "unassigned" mentor(s) either in this department or in other departments/schools/organizations who provides me with valuable guidance in research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*77) Please comment on any Mentoring Needs that you think may be relevant to building disability and rehabilitation research capacity and infrastructure at your institution.

Instructions:

Please use the scale below and select the response that best describes your research network.

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

B - 1: Research Network

*78) I have a well-developed interdisciplinary research network, particularly in areas related to disability and rehabilitation.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*79) I have a well-developed network of colleagues in the department with whom one can discuss disability and rehabilitation research projects.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*80) I regularly serve as a peer reviewer for academic journals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*81) Please comment on any Engagement With Research Actors Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*82) I make research presentations (including poster presentations) at research conferences at least once a year.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*83) Please comment on any Membership and Participation in Professional Organizations or Research Networks Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 2: Skill & Knowledge

Instructions:

Please use the scale below and select the response that best describes how you perceive your current research skills and knowledge.

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True,* 5 = *Almost Always True.

*84) I believe I am currently "up-to-date" in Research skills in my area (e.g., statistics, research design, data collection and analysis using statistical software, data management).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*85) I believe I am currently "up-to-date" in Writing skills (e.g., identifying appropriate outlet/audience, constructing concise/persuasive text.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*86) I am confident in my ability to effectively manage a grant (e.g., budget, building internal relationships, executing grant activities).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*87) Please comment on Research Skill and Knowledge Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*88) I believe I am currently "up-to-date" in research grant-procurement skills in my area (e.g., interpreting request ffor proposals, identifying funding sources, preparing grants, using research reviews).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*89) Please comment on Any Research Grant Writing and Management Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 3: Ongoing Learning

Instructions:

Please use the scale below and select the response that best describes your preception regarding opportunities for ongoing learning at your institution.

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True,* 5 = *Almost Always True.

*90) I stay very "up-to-date" on the current literature in my research interest area(s).

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*91) My academic department provides me with adequate support to travel to research-based conferences.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*92) Please comment on any Research Skills Development Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*93) I would describe myself as being internally driven to conduct disability and rehabilitation research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*94) I would describe myself as being externally driven to conduct rehabilitation research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*95) Please comment on any issues related to Motivation that you think may be relevant to building research capacity and infrastructure at your institution.

*96) I have authored or co-authored research publications in the past 2 years.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*97) I have excellent opportunities to pursue my interests in disability and rehabilitation research at my institution.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*98) Please comment on any Self-Efficacy Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 4: Participation

Instructions:

Please use the scale below and select the response that best describes how you preceive yourself as a researcher.
1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

*99) I have a well-defined plan for achieving my academic career goals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*100) I see myself as a disability and rehabilitation researcher.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*101) Please comment on any Professional Identity Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*102) My career goal is to become a highly regarded disability and rehabilitation researcher.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*103) Please comment on any Commitment Needs that you think may be relevant to building research capacity and infrastructure at your institution.

B - 5: Psychological Well-Being

Instructions:

Please use the scale below and select the response that best describes how you preceive the research environment at institution.

1 = Almost Never True, 2 = Usually Not True, 3 = Occasionally True, 4 = Usually True, 5 = Almost Always True.

*104) My department head is very supportive of my efforts in research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*105) I get constructive feedback, guidance and suggestions from my department colleagues that help me perform my best.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*106) Colleagues in my department are open to collaborating on research opportunities.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*107) Please comment on any Collegiality Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*108) I feel overwhelmed by research requirements at my institution.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*109) I am good at managing research related stress.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*110) I am able to manage existing competing factors (e.g., family, friends, time) to conducting research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*111) Please comment on any Stress and Coping Needs that you think may be relevant to building research capacity and infrastructure at your institution.

*112) I have adequate space to conduct my research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*113) The skills, expertise, and experience of faculty in my department are appropriate to accomplish our research goals.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*114) I feel appreciated and valued by my local colleagues (departments/school/university) for my work in research.

- (1) = Almost Never True
- (2) = Usually Not True
- (3) = Occasionally True
- (4) = Usually True
- (5) = Almost Always True

*115) Please comment on any Research Environment Needs that you think may be relevant to building research capacity and infrastructure at your institution.

Instructions:

Please rate the importance of the following research skills and knowledge training to your overall research development using the scale below:

1 = Very Important, 2 = Important, 3 = Moderately Important, 4 = Of Little Importance, 5 = Unimportant.

*116) Conducting a Research Needs Assessment:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*117) Identifying Research Questions:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*118) Defining Research Instruments:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*119) Piloting Research Instrument:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*120) Conducting Qualitative Studies (E.G., Focus Groups, In-Depth Interviews, Ethnographic Methods):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*121) Conducting Mixed-Methods Research:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*122) Advanced Quantitative Research:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***123)** Advanced Statistics:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***124)** Utilizing Large Databases (e.g., RSA 911 Data) For Research:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***125)** Data Collection & Analysis:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***126)** Reviewing Manuscripts:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***127)** Use of Statistical Software (e.g., SPSS) For Data Analysis:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

***128)** Use of Reference management Software Package (e.g., EndNote):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*129) Manuscript Development & publication process:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*130) Participating in Journal Editorial Boards (e.g., Rehabilitation Counselling Bulletin, Journal of the National Medical Association):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*131) Putting together Research Proposal Development Team:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*132) Research proposal development Mechanics:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*133) Interpreting Request For Proposals (e.g., NIDRR's RFP):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*134) Developing research networks and partnerships:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*135) Becoming a Proposal Peer Reviewer with federal research funding agencies (e.g., NIDRR, NHI):

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

*136) Post-award grant management:

- (1) = Very Important
- (2) = Important
- (3) = Moderately Important
- (4) = Of Little Importance
- (5) = Unimportant

Instructions:

Using the scale below, please rate your satisfaction with the identified resources of your institution:

1 = Extremely Satisfied, 2 = Very Satisfied, 3 = Moderately Satisfied, 4 = Slightly Satisfied, 5 = Not at all satisfied.

*137) Access to personal computers (e.g. laptops):

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*138) Availability of research assistants:

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*139) Up-to-date Reference Management Software Package (e.g., EndNote):

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*140) Up-to-date Statistical Software (e.g., SPSS, SAS, NVivo) For Data Analysis:

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*141) Adequate Office Space:

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*142) Availability of research mentor(s):

- (1) = Extremely Satisfied
- (2) = Very Satisfied
- (3) = Moderately Satisfied
- (4) = Slightly Satisfied
- (5) = Not at all satisfied

*143) What is your current Title and Rank? (if faculty member)

*144) How long have you worked in your current job? (Indicate in years)

*145) On average, how many students do you advise per semester? (Indicate with numeric value, example 30)

*146) On average, how many hours do you teach per week? (Indicate with numeric value, example 12)

*147) How many on-campus committees are you involved in? (Indicate with numeric value, example 4)

*148) How many off-campus committees are you involved in? (Indicate with numeric value, example 9)

These are all the questions we have for you. Thank you for your time and thoughtful response. If you have any questions or comments, please e-mail the Research Analyst and Survey Manager Dr. Andre Washington at capacitybuildingrrtc@langston.edu

Thank you!

LANGSTON
UNIVERSITY
Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Disability and Health Research Capacity Building at Minority-Serving Institutions

Semi-Structured Face-to-Face Interview Protocol

Site:

Date: _____

Good morning [Good afternoon] _____

My Name is ___(Interviewer name here)_____ and I serve as Researcher for the Langston University Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities. Thank you for finding time out of your busy schedule to participate in this interview. This study is funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). Before we start, I'd like to explain what we'll be doing in the interview. The purpose of the interview is to gain your perspectives regarding research activities Langston University Rehabilitation Research and Training Center is implementing here at __Insert Institution here_____. Basically, I'll ask you 9/8 questions about your perspectives regarding the various research activities. This interview will be kept strictly confidential and your identity will remain anonymous when we write up the aggregated results of the study. Generally the interview will take about 20 minutes. For the purpose of this interview research include LU-RRTC is implementing such as the *mentoring program* (*Peer-to-Peer Mentor Research Team Academy), research infrastructure improvement strategic planning, manuscript development, and grant writing*. With your permission, I'd like to audio record our interview as it would help me better focus on our conversation. Any questions before we begin? We will begin the audio recording.

Okay, my questions are:

1. What are the advantages of having the Research Infrastructure Improvement strategic plan to your institution? How successful have you been in implementing the plan? What challenges have you experienced implementing the strategic plan?

2. In your opinion, what are the advantages of implementing mentoring program for faculty members at your institution?

   Prompt: What do you perceive are the challenges of participating in a mentoring program designed to improve the research skills of faculty members at your institution. Are you aware of mentoring program Langston University is implementing at your institution? If yes, what are some of the specific things do you like about the mentoring program?

3. What are the advantages of conducting office of sponsored programs training at your institution? What changes have occurred as a result of the technical assistance and consulting? What challenges have you experienced implementing what you learnt during the training?

4. What are the advantages of fellows participating in the Community of Practice? ***Prompt***: What recommendations can you make to improve participation in the community of practice?

5. What are the advantages of conducting the grant writing training at your institution? What changes have occurred as a result of the technical assistance and consulting? What challenges have you experienced implementing what you learnt during the training?

6. What are the advantages of conducting manuscript development training at your institution? What changes have occurred as a result of the manuscript development training?

7. In your opinion, what are the benefits of implementing research capacity building activities (i.e., research strategic planning, mentoring, grant writing, manuscript development, IRB and sponsored programs technical assistance) at minority serving institutions?
8. What recommendations can you make to federal agencies (NIDILRR/NIH) that fund research?

9. Do you have any additional comments that you would like to share?

We have come to the end of the interview. Again, thank you for your participation

Administrators/Staff/Faculty/Students

1. In your opinion, what are the advantages of implementing mentoring program for faculty members at your institution? ***Prompt***: What do you perceive are the challenges of participating in a mentoring program designed to improve the research skills of faculty members at your institution. Are you aware of mentoring program Langston University is implementing at your institution? If yes, what are some of the specific things do you like about the mentoring program?

2. In your opinion, what are some of the advantages of faculty members participating in a community of practice where young investigators based at Minority Serving Institutions share their experiences and knowledge? For our purpose, *a community of practice is a learning partnership among faculty members who find it useful to learn from and with each other about building their research capacity and improve health and rehabilitation outcomes among community members.*

3. In your opinion, what are the advantages of conducting a grant writing and management training at your institution? **Prompt**: Please describe your experience participating in the grant writing training? How has your participation in grant writing training impacted your confidence to conduct research?

4. Please describe your experience participating in manuscript development training? What are the advantages of conducting this training at your institution? ***Prompt***: How has your participation in manuscript development training impacted your confidence to conduct research?

5. Please describe your experience participating in Research Infrastructure Improvement Strategic Planning meeting? What are the advantages of having the Research Infrastructure Improvement strategic plan to your institution?

6. In your opinion, what are the benefits of implementing research capacity building activities (i.e., research strategic planning, mentoring, grant writing, manuscript development) at minority serving institutions? ***Prompt***: What do you think about implementing these activities at other Minority Serving Institutions? Would you recommend these research activities for adoption by federal agencies that fund research? Please explain why.

7. Do you have any additional comments that you would like to share?

We have come to the end of the interview. Again, thank you for your participation.

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Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Disability and Health Research Capacity Building at Minority Serving Institutions
Focus Group Discussion Protocol (Academy Fellows)

Date: _____

Good morning [Good afternoon] _____

My Name is _____ and assisting me is _____. We are both researchers from the Langston University Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities. Thank you for finding time out of your busy schedule to participate in this focus group discussion. This study is funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). You were invited because your institution is participating in the Institutional Research Capacity Building Infrastructure Model (IRCBIM), which is sponsored by the Langston University Rehabilitation Research and Training Center (LU-RRTC) on Research and Capacity Building for Minority Entities. Before we start, I'd like to explain what we'll be doing in the focus group discussion. The purpose of the focus group discussion is to gain your perspectives regarding research activities Langston University Rehabilitation Research and Training Center is implementing at your respective institutions. Some of the activities being implemented at your respective institutions include the *Peer-To-Peer Mentor Research Team Academy, Research Infrastructure Improvement Strategic Planning, Manuscript Development, Grant Writing, Office Of Sponsored Program Technical Assistance, Building Relationships and Networks With Community Agencies, Office Of Sponsored Programs (OSP) Technical Assistance, Institutional Review Board (IRB) Technical Assistance, and Technological Support Consultation/Training*. Basically, I'll ask you 8 questions about your perspectives regarding the various research activities. This focus group discussion will be kept strictly confidential and your identity will remain anonymous when we write up the aggregated results of the study. Generally the focus group discussion will take about one hour. For the purpose of this focus group, research skills includes all aspects of disability, independent living, health, and rehabilitation research such as literature review, methodology, manuscript development, and grant writing. The academy means the *Peer-to-Peer Mentor Research Team Academy.*

Let's begin by having each person in the room tell us their name and the institution they represent.

With your permission, I'd like to audio record our focus group discussion as it would help us better focus on our conversation. Any questions before we begin? We will begin the audio recording.

Okay, my questions are:

Fellows

1. Please describe your experience participating in the Peer-to-Peer Mentor Research Team Academy. ***Prompt***: How can you characterize your relationship with your mentor?

2. What are the advantages of implementing the Peer-to-Peer Mentor Research Team Academy at your institution? What are some specific things do you like about the academy?

3. What challenges have you experienced participating in the academy?

4. Please describe your experience participating in the Community of Practice? ***Prompt***: How has your participation in the community of practice impacted your confidence to conduct research? What specific knowledge, skills, abilities, and experience have you gained from your involvement in the community of practice?

5. Please describe your experience participating in the grant writing training? What are the advantages of conducting this training at your institution? What specific grant writing knowledge, skills, abilities, and experience have you gained from your involvement in the academy? ***Prompt***: How has your participation in grant writing training impacted your confidence to conduct research?

6. Please describe your experience participating in manuscript development training? What are the advantages of conducting this training at your institution? What specific manuscript development knowledge, skills, abilities, and experience have you gained from your involvement in the academy? ***Prompt***: How has your participation in manuscript development training impacted your confidence to conduct research?

7. Please describe your experience participating in Research Infrastructure Improvement Strategic Planning meeting? What are the advantages of having the Research Infrastructure Improvement strategic plan to your institution?

8. In your opinion, what are the benefits of implementing research capacity building activities (i.e., research strategic planning, mentoring, grant writing, manuscript development) at minority serving institutions? ***Prompt***: What do you think about implementing these activities at other minority serving institutions? Would you recommend these research activities for adoption by federal agencies that fund research? Please explain.

9. Do you have any additional comments that you would like to share?

We have come to the end of the focus group discussion. Again, thank you for your participation.

LANGSTON
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Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

Peer-to-Peer Mentor Research Team Academy: Main Study

Focus Group Discussion Protocol (Academy Mentors)

Date: _____

Good morning [Good afternoon] _____

My Name is _____ and assisting me is _____. We are both researchers from the Langston University Rehabilitation Research and Training Center on Research and Capacity Building for Minority Entities. Thank you for finding time out of your busy schedule to participate in this focus group discussion (FGD). This study is funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). You were invited because you have participated in the Peer-to-Peer Mentor Research Team Academy as a mentor. Before we start, I'd like to explain what we'll be doing in the discussion. The purpose of the FGD is to gain your perspectives regarding the effectiveness of the Peer-to-Peer Mentor Research Team Academy (PPMRTA). Basically, I'll ask you 8 questions about your perspectives regarding the various aspects of the Academy. This focus group will be kept strictly confidential and your identity will remain anonymous when we write up the aggregated results of the study. Generally the focus group will take about **one hour**. For the purpose of this focus group, research skills includes all aspects of disability, independent living, health, and rehabilitation research such as literature review, methodology, manuscript development, and grant writing. The academy means the *Peer-to-Peer Mentor Research Team Academy*. **Let's begin by having each person in the room tell us their name and the team they work with.**

With your permission, I'd like to audio record our interview as it would help me better focus on our conversation. Any questions before we begin? We will begin the audio recording.

Okay, my questions are:

Research Questions:

1. Please describe your experience participating in the Peer-to-Peer Mentor Research Team Academy.
    - What are the benefits or advantages of being a mentor?

- *What challenges did you experience in your mentor role?* How did you overcome the challenges?

2. What impact do you believe the academy has had on the Fellows who participated in the Academy? What specific research knowledge and skills did fellows gain from their involvement in the academy? What specific grant writing knowledge, skills, abilities, and experience have fellows gained from their involvement in the academy?
    - What impact do you believe the academy has had on minority serving institutions involved in the academy?

3. From your perspective, would you say that the Fellows' research self-efficacy (i.e., *capabilities and confidence to execute particular research tasks*) in conducting research and developing a research proposals increased? If yes, please describe some specific indicators which demonstrate that the Fellows' confidence in conducting research and writing grants has increased.

4. What mentorship components and/or strategies were effective for building the Fellows' research and grantsmanship skills?
    - What is the usefulness of including these strategies and methodologies in training junior investigators involved in research with racial and ethnic minorities with disabilities?

5. Which strategies or components can be considered for adoption by federal agencies such as the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR) and the National Institute on Health (NIH)? Which components can be applied to other Minority Serving Institutions?

6. What results have you observed from mentoring the fellows?

7. To what extent do you feel that the Academy met your expectations? To what extent do you feel that the Fellows' expectations were met?

8. Do you have any suggestions on how the Academy can be improved?
    - Are there any additional comments or suggestions you would like to share?

We have come to the end of the interview. Again, thank you for your participation.

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Rehabilitation Research and Training Center (RRTC)
on Research and Capacity Building for Minority Entities

OBSERVATION PROTOCOL

Time:_____ Date:_____

Institution:_____ Observer Name:_____

OBSERVED PHENOMENON	DESCRIPTION
Leadership	
Structure	
Collaboration	
External Support	
Access to Resources	
Research Network	
Skills and Knowledge	
Ongoing Learning	
Participation	
Psychological Well-being	
Personal Reflection (Your own thoughts about going into the field and being there, and reflections on your own life experiences that might influence the way in which you filter what you observe)	

RCB/ Observed phenomenon	Examples of Observations	Sample Questions
Leadership	Research culture - values Vision and mission statements Incentives: Monetary support or release time to conduct research. Research seed and start-up funds Human resources	Is research infrastructure improvement prioritized. Does the institution have an incentive mechanism that encourages academics to engage in research? Is there a process which leads academics into research? How are the expectations of the institution expressed with respect to research? How are academics' innovative ideas supported and promoted for further development? What steps need to be taken to establish desired research culture?
Structure	Sponsored programs office effectiveness Institutional Review Board effectiveness Business office Effectiveness Adequacy of technological infrastructure Adequacy of Physical infrastructure - buildings and office space.	What are the strengths and weakness? How can the weaknesses be addressed? What is the desired goal?
Collaboration	Research partnerships and alliances development and nurturing - between other minority entities, traditionally White institutions, and international institutions. Partnerships with community agencies –SVRA, Independent living Council, health agencies, etc	What types of research collaborations at the institutional level exist? How can they be enhanced or strengthened?
External Support	Grant proposal review panel opportunities Access to federal research funding	How can the institution encourage its members to participate in grant proposal review panels? What infrastructure does the institution need to have established that would enhance its access to federal research funds?
Access to Resources	Technological resources -computers, printers, statistical software (e.g., SPSS, Nvivo, Endnote) Library resources – e.g., databases, access to the library, etc Formal mentoring	What research resources are available to support research efforts? How can they be improved? Which resources are missing that hinder research productivity?
Research Network	Availability of systems that facilitate engagement between faculty members and other research actors. Systems that promotes interdisciplinary/ multidisciplinary research teams	How can faculty members be assisted to engage with research actors (research leaders, peer investigators).
Skills and Knowledge	Infrastructure that support skills and knowledge development (e.g., Research methodology and grant writing trainings).	What professional development programs need to be improved or developed to expand junior investigators research skills and knowledge?
Ongoing Learning	Infrastructure that support lifelong learning (e.g., Conference participation funds; peer reviewer opportunities).	What infrastructure need to be improved or developed to facilitate ongoing learning?
Participation	Infrastructure that supports investigators' involvement in shared governance.	How are investigators involved in decision-making processes, especially as pertains to grant management?
Psychological Well-being	Infrastructure that support Wellness (e.g., stress management, coping, and resiliency programs)	What are steps that need to be taken to promote psychological well-being of investigators?

Funding Agency:

NIDILRR

National Institute on Disability, Independent Living, and Rehabilitation Research