

1. LRDC 2018 Provost Report Executive Summary

1.1. Mission and Strategic Goals. LRDC aims to continue as one of the top centers of its kind in the world, one with creative, productive, and collaborative researchers from multiple disciplines who contribute substantially to the sciences of learning and education in ways that can inform the world of educational practice. As conveyed in its founding proposal, LRDC was to be the first national center on learning and education, connecting basic and applied learning research with instructional practice. Its mission remains important, as the need for adaptive learning increases with world-wide economic, social, and technical change. This mission, aligned with Goal 2, instantiates the University's commitment to research and scholarship that contributes to the public good. Our main strategy is to bring exceptional researchers from across disciplines into a collaborative environment that supports research on learning--its cognitive, neural, developmental, and social aspects—and instruction, educational policy, and everyday out-of-school learning.

1.1.1. Engage in Research of Impact. Our plan targets research priorities within two broad areas: 1) Learning sciences, drawing on cognitive, neuroscience, and social-affective perspectives and methods. 2) Educational Sciences, the study and design of educational improvement. We identify five priority research areas: language and literacy, learning neuroscience, motivation, higher-level cognition, learning technology, educational research and practice. An emerging area is success and equity in college education. Our strategies include the following:

Priority Research Areas. We aim to maintain our current areas of excellence in learning in literacy, science, and math, while strengthening newer areas: 1) the neuroscience of learning, aided by joint appointments with the Brain Institute and the Dietrich School 2) social-motivational-affective processes in schooling, partnering with the School of Education and the Department of Psychology; 3) college access and learning, partnering with several University units.

Recruiting and Retaining for Excellence: Tenure Stream Faculty. Our strategy is to partner with other units to bring in researchers who can thrive in LRDC's interdisciplinary environment. LRDC has 28 jointly-appointed tenure stream faculty, with 10 having come as Assistant Professor levels within the last 6 years. We work with our partner units to retain our best faculty by supporting their timely promotions and opportunities for dual career couples.

Non-tenure Stream Researchers. Important in our research are our non-tenure stream research associates and post docs--11 Research Associates and 7 post-docs currently.

External Funding. We promote a culture of collaborative grant applications and provide strong administrative support for applications and for post-award periods.

Promoting Collaboration. Cross-area collaborations are critical to an interdisciplinary research center. We create a culture of collaboration through research group meetings and presentations at monthly faculty meetings, exposing opportunities for collaboration. The Director of Communications provides research updates on digital billboards, web-pages, and newsletters

Internal Awards Program. This annual program is an engine for new collaborative research and external grant applications. It uses RDF funds to support new two-year projects, facilitating collaborative research that leads to external applications. Since 2009, 38 external applications originated from research supported by the Internal Awards Program, with 15 funded.

Other Plan for Pitt Goals. LRDC engages all six goals, as summarized in the next sections:

1.1.2. Advance Educational Excellence (Goal 1). LRDC creates many educational opportunities for undergraduate as well as graduate students. We have created a research culture that includes and values students, bringing them into mentored relationships with faculty.

Undergraduate Research Experience. Undergraduates discover the world of learning sciences while participating in various phases of the research process, mentored by LRDC faculty, post-docs,

and graduate students. In 2017, 90 students participated in research across 14 LRDC faculty labs. An additional 10 freshmen were in LRDC as part of the First Experience in Research Program.

PhD study. LRDC is home to graduate students earning PhDs in LRDC's partner departments—65 students in 2017—providing a value-added cross-discipline experience. A cross-department graduate student committee facilitates interactions. Most graduate students become part of interdisciplinary research teams at some point in their training.

1.1.3. Strengthen Communities (Goal 3).

Alumni Community. We created a data base to build an LRDC alumni community and nurture it through a bi-monthly newsletter and other communications. The **LRDC Distinguished Alumni Award** strengthens both LRDC and its alumni community. The fourth award was presented to 2017 to Mauricio Delgado (Rutgers), a former LRDC/Neuroscience PhD student.

External and Internal Communications. Internal communications have been instrumental in maintaining a collegial community in LRDC: frequently updated webpages, weekly notices of talks, publications, news, awards and an electronic lobby display of a variety of daily updated information.

University Community. LRDC makes formal connections with five schools through joint faculty appointments and appoints Center Associates from other units to recognize collaborations with LRDC faculty. Currently, we have 9 Center Associates from 4 different Pitt schools.

University Learning-Teaching Community. LRDC collaborates with the University Center on Teaching and Learning (UCTL). The LRDC Director is on the Provost's Advisory Council on Instructional Excellence and the Teaching and Learning Exchange.

Local and Regional Communities. Multiple community projects include out-of-school learning collaborations with Pittsburgh institutions (e.g. The Children's Museum), projects by the IFL with Pittsburgh area schools, and work with foundations on local educational initiatives, including the Pittsburgh Promise, by LRDC's Evaluation for Learning project.

1.1.4. Promote Diversity and Inclusion (Goal 4). LRDC creates an inclusive environment and continuously seeks to increase diversity. Our research addresses social, economic, and racial factors in educational outcomes. Four of 28 tenure stream faculty were born outside the U.S. and two others are members of under-represented American minorities (Native American and Hispanic). However, with a recent retirement, no African Americans are among the active faculty. In 2017, LRDC was home to two African-American, nine Hispanic/Latino PhD students, and three African American post docs. Four of 12 Research Associates were born outside the U.S. We commit human resources and funding for specific programs that include 1) a Summer Research Internship program for undergraduates, 2) graduate and post-doctoral fellowships that increase diversity, 3) funding and mentoring for Hot Metal Bridge (HMB) students and funding the HMB PhD student coordinator.

1.1.5. Embrace the World (Goal 5). Goal 5: Embrace the World. LRDC hosts 10-20 international scholars each year and is home to a similar number of international graduate students. In addition to 10-15 active international research collaborations annually, three faculty have long term affiliations with universities abroad and two others serve on international advisory boards. At the institutional level, LRDC has a collaboration with the National Engineering Research Center for E-Learning (NERCEL), China's national research center in education at Central China Normal U.

1.1.6. Build Foundational Strength (Goal 6). We maintain a supportive and collegial work environment where all feel their efforts are valued and their inputs welcome. Our strategies include: 1) **a participatory environment.** Decision making is informed by Input from faculty (faculty meetings, executive committee meetings), staff, who serve on joint faculty-staff committees, and graduate students (through the center-wide student committee). The Director of Communications creates frequent and wide-ranging information notices. 2) **an attractive workplace.** Because having a work

place where people want to be is important for all other goals, we initiate continuing improvements in open spaces and offices, renovations of conference rooms and upgrading of video displays. 3) **Establishing and maintaining effective management.** An elected Executive Committee addresses a wide range of issues, manages our Internal Awards Program, and provides annual evaluations of faculty. The Director meets with the Associate Director for Educational Research and Practice, the Director of Administration, the Director of Communications, and the Manager of Computing Services. These various meetings address strategic and management issues, review budgets, and plan technology services and numerous Center-wide events.

1.2. Major Accomplishments-Year Overview.

Overall Research Productivity and Impact. In 2017, LRDC researchers published 165 journal articles and conference proceedings (and three books). Citation data on Google Scholar (Feb, 2018) are available for 9 of LRDC's 11 tenure-stream Senior Scientists (Full Professors) and for all 17 Research Scientists (Assistant and Associate Professors). The mean *h-index* of these groups is 57.4 and 15.4, respectively. As an indicator of recent impact, the mean *h-index* since 2013 is 36 for Senior scientists and 14.2 for Research Scientists.

Research funding remained strong during both FY 2016 and FY 2017, with \$24.8 million in faculty research grants (including Research Associate grants, the total is \$26.2).

LRDC as a center for learning/educational neuroscience. With the founding of the Brain Institute, LRDC accelerated its already substantial research on the neural bases of learning. Two researchers hired in the fall of 2016 established labs, launched research programs and submitted grant applications. With more senior researchers in this area, we now have a strong research area that addresses learning and education in multiple ways, e.g., the neural bases of learning in math and reading and the effects of socio-economic stressors on brain development.

Research into Practice to Improve Schooling. We highlight two examples here.

Learning science and education policy. LRDC researchers have multiple large education grants for large-scale school improvement projects. This work is exceptionally high-impact research, reaching educational policy across an entire state (Tennessee). A new McDonnell foundation grant supports a new cross-discipline collaboration of learning scientists and education researchers to study teacher learning in mathematics and literacy classrooms.

Institute for Learning (IFL). The IFL, directed by Tony Petrosky, developed a partnership with Darwin Global, which began online professional development services in 2017. The IFL leadership team was strengthened with the addition of two new co-directors, with expertise to strengthen its grant funding and research component (Chris Schunn) and its professional development expertise in literacy and math (Lindsay Clare Matsumura).

College learning and instruction. From individual and initially unrelated projects, we created a new research area, College and Pre-College Teaching and Learning (CPTL). Beyond cognition and technology, the research includes engagement and motivation and social support for access to college and subsequent success. The Stanford-based College Transition Collaborative (CTC) is a complement to this research, which reflects the ideal of a campus as a laboratory for learning and teaching. This research area connects LRDC with the Teaching and Learning Exchange, which includes the University Center for Teaching and Learning (UCTL) and db-CERT.

LRDC-UCTL partnership. In 2017, the LRDC-UCTL collaboration brought in two new post-docs to work on new projects to support university teaching, adding to 2016 projects that included specific department initiatives (e.g., on-line learning in the School of Nursing) and broader scope projects (e.g., the linguistic features of message-board postings that predict instructors' responsiveness). The new work includes course improvement projects through the new Course

Incubator initiative. Monthly team meetings of post-docs, LRDC mentors, and UCTL Director Cynthia Golden and Lorna Kearns guide the work.

Technology supported learning. LRDC's program of learning technology centers a core group of three faculty whose impact is leveraged through collaboration—e.g., a project that applies natural language processing to scoring student writing and providing feedback. In 2017 we began joint faculty recruitment with the School of Computing and Information, a very important step for maintaining faculty leadership in this important area.

Diversity. We initiated an internship program for undergraduates that brought four African American and one Hispanic students to work with LRDC faculty mentors in the summer of 2017. The program included career development (e.g. applying to graduate school) and research, which concluded with a well-attended "Poster Brunch". At least two of the students are applying to PhD study at Pitt this year. LRDC again supported students in the Hot Metal Bridge Program and funded the PhD student coordinator. We added three African American post-doctoral research associates, including one through an LRDC Director's fellowship.

International. LRDC hosted 20 international visiting scholars (13 faculty, 7 post-docs) and housed 15 international Pitt students from 17 different countries. LRDC faculty had 19 active collaborations with researchers in 15 different countries.

- 1.3. **Recognition.** Nine LRDCs faculty received significant academic recognition: (Full listing in Appendix) **Jamie Hanson**, named a Rising Star by the American Psychological Society, an early career award to outstanding psychological scientists. **Diane Litman**, elected a Fellow of Association of Computational Linguistics (ACL) for her key contributions to dialog systems research. **Lindsay Page**, the Association for Education Finance and Policy (AEFP) Early Career Award. **Charles Perfetti**, the Distinguished Scholar award of the AERA Reading and Literacy SIG for outstanding contributions to research in reading and literacy; also elected to the Federation of Associations in Behavioral & Brain Sciences program honoring eminent, senior scientists who have made a lasting impact. **Jennifer Lin Russell**, named to the National Advisory Board of the National Education Researcher Database (NERD). **Ming-Te Wang**, the Richard E. Snow Award from the APA for Early Career Research Contributions in Educational Psychology (Mar 2017) and the Lyle Spencer Research Award for developing a framework of best practices for how African American caretakers advance their adolescent's educational outcomes. **In addition**, four faculty received recognition of other kinds, as shown in the Appendix.

Media Recognition. At least 13 different LRDC faculty received national/international, regional print and online media notices. **Bringing Words to Life**, by **Margaret McKeown, Isabel Beck, and Linda Kucan**, listed among the "ten books every teacher should read" by *The Guardian*, the world's third largest newspaper website. **Lindsay Page's** research related to obstacles to students' pathways to college received notice from articles in the *NY Times*, *Wall Street Journal*, and *The Atlantic*, among others. **Jamie Hanson's** research on the long-term consequences of child abuse was the subject of a *Pittsburgh Post-Gazette* article. A fuller listing is in the Appendix

- 1.4. **Goals & Strategic Action Planned for Next Year**

Complete New LRDC Strategic Plan. Work on a new strategic plan began in the fall of 2017 by five planning subgroups. Subgroup plans will be brought together in a Center-wide faculty effort to create an updated plan fully aligned with the Plan for Pitt. The working plans suggest the following:

LRDC as a center for learning/educational neuroscience. To add to a thriving core of research in learning neuroscience, we will support the research programs of our new faculty so that they can develop collaborative high-impact projects that link neuroscience research to learning-related behavioral and social outcomes.

Enhancing LRDC's learning computation and technology capacity. The immediate goal is to keep our current level of faculty strength by replacing a vacated position in a joint recruiting effort with SCI. Our larger goal is to enhance our research in this area, including additional joint recruiting.

College Learning and Instruction. We will support new collaborations that have been emerging over the last year and partner with other units, including the UCTL and the Teaching and Learning Exchange. LRDC researchers will be active in the Personalized Learning initiatives.

Research into Practice to Improve Schooling.

Learning Science and Education Policy. LRDC researchers are deeply engaged in high impact educational improvement projects, including state-wide school improvement projects with the Tennessee Department of Education. In the broader national context, we will begin to make our distinctive focus on learning and teaching a more visible model for educational improvement.

Institute for Learning. Because the IFL is a major, successful agent of large-scale school improvement projects, our major goals are to secure the IFL's financial status and to create more IFL ties with the School of Education. One strategy that serves both goals is the positioning of exceptional IFL Fellows in teacher training positions in the School of Education.

Diversity. Our goals are 1) to maintain the recent success in increasing diversity and 2) to target research areas that are especially important for issues of academic access and achievement. After its success last year, we plan to host a second year of our summer internship program for minority undergraduates. We will continue our partnership in the Hot Metal Bridge program. We plan to join with Department of Psychology in requesting joint faculty recruitment across broad areas of research focus with the goal of adding to the racial and ethnic diversity of our faculty.

The Pitt Community:

School of Education. In addition to increasing ties between the IFL and the School, LRDC will work with the School to develop a shared resource in area schools that could connect thousands of local students and their teachers to University research and professional development. We will share LRDC's strategic plan with the School to identify future joint appointments and other connections.

School of Computing and Information. We hope to add a jointly appointed faculty member and to cooperate with SCI to create a stronger computing component in learning and education

Department of Psychology. We have jointly recruited outstanding faculty in recent years and we plan additional joint efforts, with a focus on diversity at the faculty level to add to our strong collaboration at the graduate student level.

University Center for Teaching and Learning. We will continue to work with UCTL in educational improvement projects.

Global Communities. LRDC will host **IWOLS**, the International Workshop on Advanced Learning Science (IWOLS) in June. LRDC's agreement with **NERCEL** at Central Chinese Normal University is now in a specific project stage (the Smart Teacher Project). The immediate goal is to determine whether this project can begin effectively, given administrative complexities on the NERCEL side.

1.5. Challenges and Concerns.

External Funding. As a research center, LRDC's continuing challenge is securing funding for research. We have had consistent success in external funding, but uncertainty about traditional federal funding sources is an issue, especially for IES, which currently funds some large LRDC projects. Our internal awards program is an important strategy for stimulating new research projects for external funding. Because the RDF attached to federal grants supports this program, we favor federal over foundation grants, but our strategy includes substantial applications to foundations.

Core Staff. A second financial challenge concerns support for LRDC's core technical staff. We receive

University funds for partial support of tech and administrative staff, but much less than the actual cost. For the last three years, federal funding rules have disallowed general tech support to be charged to research grants, requiring us to charge most of tech salaries and benefits to 04 accounts—this year, \$316,000. These are accounts we use for special projects, including Director’s fellowships for graduate students and post-docs, which support our diversity goals. Over the next 3 years, we need to address this issue through increased funding, new support strategies, and/or additional staff reductions (we eliminated a tech staff position 3 years ago to reduce costs).