



Institute for Intelligent Systems

365 Innovation Drive, 403B  
Memphis, Tennessee 38152-3230

Office: 901.678.5102

fax: 901.678.1336

[iis.memphis.edu](http://iis.memphis.edu)

November 5, 2018

Charles Perfetti, Director of the Learning Research and Development Center  
Learning Research and Development Center  
University of Pittsburgh  
3939 O'Hara Street  
Pittsburgh, PA 15260

Dear Director Perfetti,

Enclosed is the report from the recent visit of the LRDC Board of Visitors. We appreciate your efforts to organize a very engaging experience that included interesting reports on research areas of focus and your updates on the different dimensions of the center. We were happy to meet and receive the presentation of the Provost and Senior Vice Chancellor Ann Cudd. The discussions with the LRDC faculty, staff, postdocs, students, Executive Committee and you have provided important relevant information to prepare this report.

Let us know if there are any questions about our report. This is my first year as Chair of the Board of Visitors and look forward to assist LRDC in the foreseeable future.

Sincerely,

Art Graesser  
Professor, Department of Psychology and Institute for Intelligent Systems  
Distinguished University Professor of Interdisciplinary Research, University of Memphis  
Honorary Research Fellow, Oxford University, UK

TO: Charles Perfetti, Director of LRDC

FROM: LRDC Board of Visitors (Hilda Borko, Thomas Carr, Barry Fishman, Art Graesser [Chair], Judith Harackiewicz, Ping Li, Danielle McNamara, Kenneth Pugh, Stephanie J. Rowley, and Stanley W. Thompson). Gautam Biswas, Suzanne Donovan, Timothy Shanahan, and Reed Stevens were unable to attend the 2018 meeting but reviewed and responded to this report.

RE: LRDC Board of Visitors Meeting, October 11-13, 2018

During our October 11-13 meeting in Pittsburgh, the LRDC Board of Visitors had the opportunity to listen to presentations and hold discussions with LRDC faculty, research scientists, research associates, staff, postdocs, and students in addition to having meetings with the Executive Committee and Director. We also met and listened to a presentation from the new Provost and Senior Vice Chancellor Ann Cudd. Prior to traveling to the meeting, we reviewed a website that posted the agenda and background reading materials on LRDC (<https://www.lrdc.pitt.edu/BOV/home.cshtml>). On the evening of October 11, Director Charles Perfetti welcomed us and shared some of the salient news about LRDC and the Director of Administration Patsy Guzzi Jr. reviewed the Center's current financial picture. The sessions on October 12 were devoted to interactive presentations of illustrative LRDC research, including a poster and discussion section led primarily by graduate and undergraduate students. During the afternoon some members of the Board of Visitors met independently with non-tenure-track research scientists, research associates, and postdoctoral fellows; the other members had a separate meeting with graduate students. The morning of October 13 included an additional session on research, followed by an internal meeting among the Board of Visitors to discuss LRDC and plan our report. The Board ended the visit with a meeting over lunch to discuss our thoughts and recommendations with the LRDC Director and the Executive Committee.

This report summarizes our observations about the overall state of the Center and comments on current and potential research directions. Some of our comments address pressing issues raised in the 2016 Board of Visitor report that were considered top-level challenges, namely the evolution of the Institute for Learning, diversity, and the "centeredness" of LRDC. Other comments address opportunities for LRDC to build on its major contributions in neuroscience, computational technologies, and other areas of research to enhance its international visibility in learning and educational sciences. We also raise some questions about the mentorship and involvement of students and postdocs in LRDC.

### **Highlights of the State of the Center**

The Board was extremely impressed with the scope, depth, and novelty of the interdisciplinary research contributions that were presented at the visit and on the website. LRDC continues to be an international leader in its mission, a mission that Chuck Perfetti pointed out was articulated in its original 1963 proposal to the Department of Education that created LRDC (Glazer & Gow, 1963): "*expediting fruitful interaction between learning research in the behavioral sciences and instructional practice in the schools.*" More of Glazer and Gow's words are particularly illuminating and justify the need for a center: "*...This interaction does not*

*just happen; somebody must work at it.”* LRDC has indeed continued to be nationally and internationally visible in pursuing and achieving this mission.

LRDC has a distinguished history at the University of Pittsburgh and throughout the world, consistently responding to, and often leading, international trends in the science and practices of learning and instruction. This history is interesting but it is also very complex and multifaceted. Researchers, policy experts, and the public at large may desire a quick and accessible introduction to LRDC and would benefit from a coherent and compelling presentation, perhaps integrating some of the 50-year-anniversary materials compiled a few years ago that included an engaging film in addition to assorted digital and printed pictures and documents. Developing such a presentation would likely be a prudent contribution to LRDC’s strategic planning, helping to demonstrate its place in the larger Strategic Plan for the University of Pittsburgh that is guiding pursuit of the University’s major goals.

There are many salient successes since the previous Board visit in 2016, too many to summarize in this report. These successes were described in the sessions on social and biological factors in school success, literacy neuroscience, large-scale instructional improvement, university teaching and learning, motivation and engagement, and computational technologies to support text-based reasoning and argumentation. The Board was extremely impressed with the financial report that external funding had approximately doubled during the last five years, at a point in history when external funding has become more difficult to acquire. The use of indirect cost money to fund internal crosscutting research was clearly successful in light of the outcome that 17 of the 30 funded internal LRDC grants resulted in externally funded proposals for several million dollars. The recent Gates Foundation grant was an important win for the Institute for Learning. Regarding faculty, LRDC has a healthy flow of new faculty with 11 of 30 tenure-track faculty being hired during the last 6 years. The Committee on Diversity has made notable progress in increasing diversity in graduate students and postdocs. LRDC has excelled on the global dimension of diversity, noting the 20 international scholars and hosting the 6<sup>th</sup> International Workshop on Advanced Learning Sciences. This achievement is compatible with the Global mission of the University of Pittsburgh. However, diversity in faculty continues to be a major problem that needs to be addressed in LRDC (as well as at many other cohort academic institutions throughout the country).

The Board of Visitors has comments and suggestions that we hope will be helpful for LRDC to continue its distinguished history in advancing research in the learning sciences and educational practice.

### **Institute for Learning, Policy, and Scaling-up Research Contributions with Schools**

The Board of Visitors views IFL as a critically important component of LRDC. Looking towards the future, IFL has the opportunity to conduct significant research on educational innovation and play a key role in helping LRDC maintain its historical role in linking cutting-edge research to educational practice, and in the development of new research genres that combine knowledge from research and practice. To repeat the line quoted above from its original Department of Education proposal, a key function of LRDC is to support the “fruitful interaction between learning research in the behavioral sciences and instructional practice in the schools.”

We strongly believe that LRDC should both continue in its support of IFL, and work to grow IFL into a fully-functioning laboratory of LRDC that is a peer to other active research groups, in contrast to its current, somewhat confusing, status as a center that is somehow both fully contained within LRDC yet also independent of LRDC.

The IFL has made significant strides in the past two years, including changes in leadership, expanding affiliations with LRDC scholars, success in obtaining external funding with the new BMGF-supported collaboration with Dallas Public Schools, and the formalization of a partnership with Darwin Global to provide online coaching to support professional learning. LRDC continues to provide significant budgetary support for the work of IFL from internal funds. The amount has decreased from prior levels and hopefully will continue to decrease as IFL continues to move in its current direction.

In its 2016 report, the Board of Visitors used terms like “consulting group” for the IFL, and described it as “a hub for providing research-based solutions and services” to schools. But the Board also described IFL as “a crucible for studying education improvement, which is itself conceived as a learning process.” The 2018 Board feels strongly that this latter description of IFL, as a “crucible” for cutting-edge research on education improvement, is the one that LRDC should focus on and work to expand. IFL’s role is crucial in evidence-based educational improvement, especially in assisting districts in staff professional development and molding school culture. As such, it will be essential for IFL to explore how its efforts can further influence the policy landscape of districts and schools where emerging data can be used to assist decision makers in drafting and sustaining policies that move beyond narrow assessments to promote more comprehensive and coordinated academic, social, and emotional learning.

As a field, educational scholarship has moved beyond a focus on “dissemination” of research into practice towards new genres of research on learning and teaching that is situated in schools and classrooms and conducted in the context of research-practice partnerships. Indeed, scholarship on research-practice partnerships is a rapidly growing area in educational improvement, and includes approaches such as Improvement Science, Design-Based Implementation Research, Networked Improvement Communities, and other related methodologies. What all of these approaches share in common is a claim that research-based improvement of education is not a problem of “translation” from research into practice. Instead, it is a problem of reframing the *relationships* between research and practice to co-create designed solutions to educational problems that are informed by and contribute to research knowledge. This core claim is itself a researchable proposition, and there are multiple research groups across the country developing research agendas around this idea. LRDC is fortunate to have scholars with close connection to the Carnegie Foundation for the Advancement of Teaching, which has been studying the Networked Improvement Community approach that is featured in the new collaboration with Dallas Public Schools. We would like to see LRDC/IFL build on this approach to become a nationally-recognized center for scholarship and leadership on research-practice partnerships in general. Such a focus would benefit work across LRDC by providing a grounding context for considering the eventual contributions to practice from even the most “basic” of research on learning, cognition, and neural functioning.

We recognize that, among the organizational challenges facing IFL within the LRDC context, is the relatively large number of key participants from the world of practice who do not hold PhDs or participate in “traditional” scholarship. Given the engaged nature of research conducted in close partnership with practice, such personnel are key to establishing the credibility of the work and making connections to practice. The Board urges LRDC to consider such personnel as core to the mission of LRDC, and to develop appropriate pathways for recruitment, review, and promotion for these vital educational professionals.

### **Neuroscience Contributions to the Science of Learning and Education**

It is clear that the neuroscientific work being conducted at LRDC has significant implications for the science of learning and education. Research at the interface between neuroscience and learning/educational sciences has been a focal area in recent years at LRDC, under the senior leadership of the Director Chuck Perfetti, Julie Fiez, and Walter Schneider. The new neuroimaging collaborators (Jamie Hanson, Marc Coutanche) add to this strength with state-of-the-art approaches to structural and functional analyses that should serve larger center goals in the area. A particularly well-developed component in this direction is literacy neuroscience, which connects basic neurocognitive processes to cross-cultural/cross-linguistic differences and educational practice.

There remain a few gaps that the Board has identified, which should be filled in the future. First, although the neuroscience work on literacy acquisition is impactful, much of the work is conducted by independent groups that seem to be missing opportunities for collaboration. This is especially true when groups use different research methodologies, such as EEG/ERP versus MRI. Given that multimodal imaging is becoming the norm today, it is important for LRDC, as a center, to integrate work in this direction, and provide mechanisms for student-faculty collaborations across groups using distinct methodologies. In this regard, the Board asked how the cross-linguistic/cross-cultural work that has been the core of some of the literacy neuroscience research can have increased national and international collaborations. Second and related to this point is that given today’s limited resources pitted against the scope of interdisciplinary work, it is imperative that cutting-edge research should involve multisite, large-scale data acquisition and comparison. Third, to make the science clearly relevant and useful to educational practice in the school context, the LRDC researchers should consider ways in which their research can point to individual differences that may be due to cognitive, motivational, and linguistic factors, and ways in which they might make use of large-scale data collected from multimodal imaging and cognitive/behavioral testing to inform the design of personalized learning programs. This is especially interesting given the opportunities in other educationally oriented work currently going on at LRDC, particularly in the realm of motivation and metacognition. The expansion and integration of cognitive neuroscience with motivation and metacognition would appear to be a fruitful direction for the LRDC to pursue in the near future. The Board also notes that it will be critical that the LRDC asserts its role in the new neuroimaging facilities on the University of Pittsburgh campus from the outset. The exciting advances in assessing and calibrating measurement accuracy of MR scanners being made by Schneider and his co-investigators could serve LRDC very well both in expanding collaborations with other learning-neuroscience research groups nationally and internationally and in establishing an important and unique presence in Pitt’s own internal imaging facilities.

## **Computer Technologies that Enhance Learning and Education**

Technology needs to play an essential role in any advanced center in today's world. It is part of University of Pittsburgh's mission and reflected in its new School of Computing and Information (SCI). The research presented in the computational technology session and follow-up discussions had a healthy balance of cutting-edge technology, involvement of partners in educational settings, and quantitative rigor in the assessments. Automated interpretation and assessment of answers to questions, summaries, spoken utterances, and other open-ended expressions of students is a hot area for funding and collaborations with industry. There needs to be serious involvement with instructors and school systems for these technologies to scale up and LRDC is well positioned to be a national leader in making these connections.

LRDC is encouraged to invest further in faculty lines and other resources to keep pace with the rapid changes in technology in our society and education in particular. There needs to be new hires to build on the interdisciplinary research contributions of Diane Litman in Computer science, Kevin Ashley in Law, several faculty in Psychology, and other leaders in the successful Intelligent Systems Program. Provosts, Deans, and Directors are expected to exert serious leverage in persuading Chairs in relevant departments to hire interdisciplinary faculty that are respected in the departments.

## **Diversity**

Although faculty diversity continues to be a challenge for LRDC, there is a great deal of diversity and equity related research underway. This includes the exciting new grant from the Gates Foundation that will include large samples of Latino students from Dallas, research on racial differences in the experiences of low-income families, and the academic engagement and motivation of women and ethnic minorities in science courses. The representation of these research themes is a likely reason for the center's ability to attract outstanding students and post-docs of color. This research may also be used to leverage the recruitment of more faculty of color with related interests. The center is to be commended for posting a position that is aimed explicitly at recruiting faculty committed to race-related research, which may attract applications from researchers from underrepresented backgrounds. Explicit connections to more diverse units such as CUE and Social Work will likely make this position very attractive.

The Board recognizes that LRDC's long-term commitment to diversity has not yielded a particularly diverse group of faculty. Additional strategies are clearly needed. Other universities have effectively used post-doc-to-faculty positions that use 1 or 2 years of post-doc as a transition to a tenure-track or research-track position. Another strategy would be the recruitment of a senior person who might attract a cohort of junior scholars in the future. Senior scholars may feel less dependent on local scholarly communities and more willing to work to build a diverse faculty. The most effective strategies for adding diversity often begin with strong, reciprocal relationships with partners who are likely developing outstanding students of color who are well trained.

We also noted that, given the lack of diverse faculty, graduate students reported that much of the work of creating a welcoming and supportive environment for students from non-dominant backgrounds falls to them. This creates pressure on the students, who told us that they need more local support from faculty. There is also a mismatch between the way(s) students feel supported in their home departments and the way they feel supported within LRDC. Moving forward, LRDC might attempt to better understand the range of mechanisms across their constituent students' academic departments, and attempt to provide coordinating support within the Center.

### **Centeredness of LRDC**

The 2016 Board report noted that LRDC has continued to expand to new exciting areas of learning and development and that the evolution of LRDC has moved it away from its historical focus on basic learning processes in different disciplines and subject matters, such as mathematics, history, science, literature, and law. Board members noted that this gap remains. The Board also recognized that the integration of the motivation group with the rest of the center deserves continued attention. We agree that motivation and other social processes play critical roles in learning but feel that more could be done to make those connections explicit.

Discussions with students and faculty suggested somewhat uneven cohesiveness and collaboration of research clusters. In particular, members of the literacy group noted many opportunities for collaboration and a strong sense of community. Other groups, such as the motivation group, had fewer collaborative projects between their group and others. One suggestion might be to use some portion of the Center's seed funding for specific Requests for Proposals that are aimed at particular learning and development grand challenges that might cut across clusters within LRDC. New directions in college and pre-college learning could constitute an interesting way to link learning, motivation, identities, neuroscience, and literacy. This line of research also offers opportunities to lend LRDC expertise to the university mission.

LRDC was originally built around the investigation of disciplinary literacy and school learning – the cognitive and instructional processes that support learning and teaching in classrooms. In the 2016 report the Board noted that research being conducted on these issues had diminished in relative importance, superseded by growth in new directions: studies of learning and learning-relevant social interactions in extra-classroom settings such as museums, cognitive-neuroscientific investigations of word recognition and reading, curriculum development and intervention delivery at school and system levels, and the Institute for Learning's consultation and partnership activities. In 2018 the Board sees these trends continuing. While there is much to like about the wide range of high-quality work being undertaken, there is room for concern about increasing fragmentation of interests and intellectual resources. A Center's year-to-year research portfolio and day-to-day research activities can successfully arise from the bottom up, through individual investigators' pursuit of particular projects that interest them, as long as funding can be secured and the projects can be well conducted. However, the longer-term health, reputation, and impact of a center depends in addition on systematic guidance from a coherent vision. The Board wondered whether more concern could be paid to that higher level of LRDC's organization, planning, and decision-making. The Director's opening remarks might serve to illustrate this concern; they began with a list of the topical areas of current research

projects, but could have had a stronger overarching description of the vision and high-level goals that define what topics among the many possible are in fact appropriate and fitting LRDC pursuits. In discussing our concern in the closing session, one of LRDC's Executive Committee invoked Alan Lesgold's succinct expression of LRDC's highest aims: "Understanding Learning, Improving Teaching". The Board encourages LRDC to devote some effort to unpacking that motto, re-examining the original mission of the Center, reflecting on its history, and elaborating a coherent direction for the future. This is especially important at this point in time in the context of designing and moving into a new building, hiring new and more diverse faculty, and achieving smooth and beneficial leadership transitions as institutional time passes.

The Board is confident that these challenges will be met with thoughtfulness and foresight. We appreciate the privilege to advise and support LRDC in its achievements, distinguished history, and international impact.