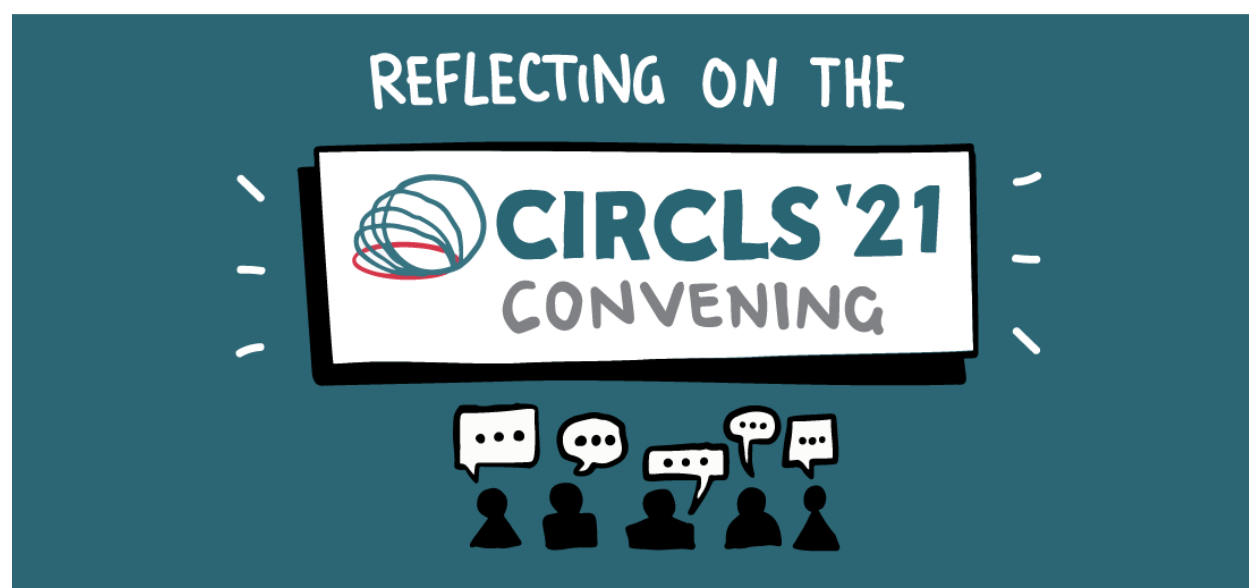


From Broadening to Empowering: Reflecting on the CIRCLS'21 Convening

February 2022

FROM
◀ **BROADENING** ▶
TO
EMPOWERING



From Broadening to Empowering: Reflecting on the CIRCLS'21 Convening

Overview

The Center for Integrative Research in Computing and Learning Sciences (CIRCLS) research community focuses on emerging technologies for teaching and learning. This community includes both awards in the National Science Foundation (NSF) program area of Research on Emerging Technologies for Teaching and Learning (RETTL) as well as research funded elsewhere that has an emerging learning technologies focus. On September 13 and 14, 2021, CIRCLS hosted a convening on the theme “Remake Broadening.” This report focuses on the strategic outcomes of the convening. The convening culminated with eleven strategy sessions that reported out in a town hall meeting. The CIRCLS team organized the outcomes of the strategy sessions and town hall into four detailed recommendations, each reported on a subsequent page:

1. Preparing Researchers
2. Changing the Design Focus
3. Improving Partnerships
4. Rethinking Broader Impacts

Continue reading about the convening and join us in taking up this work through our call to action.

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About the Convening

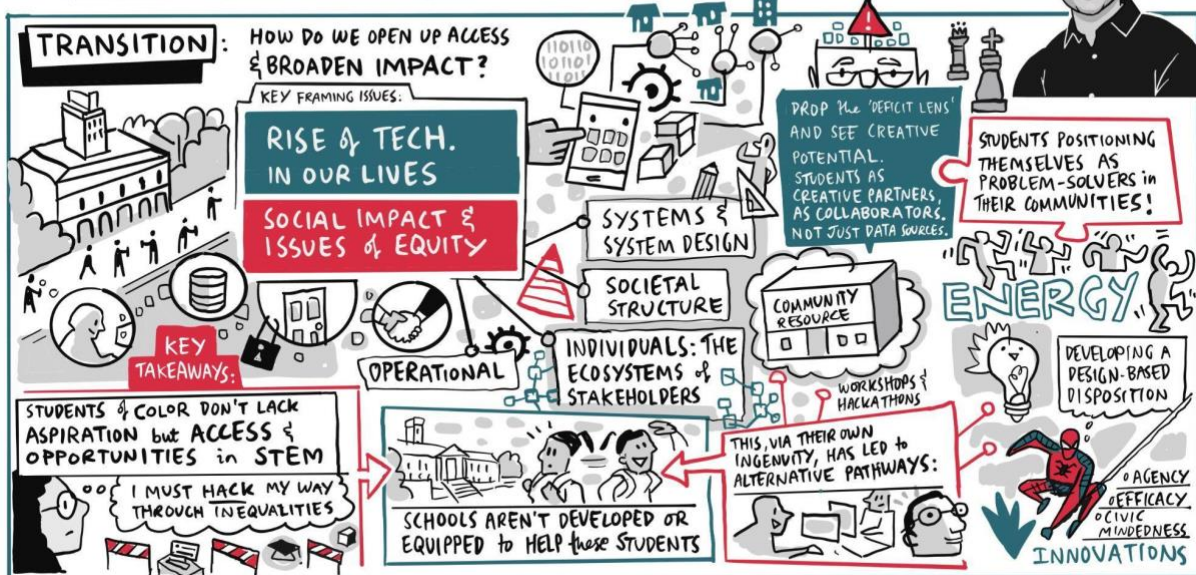
The “Remake Broadening” Theme

Learning technology researchers have long spoken of broader horizons, broader impacts, broad teamwork, broadening participation, and more. Our theme engaged with the importance of thinking critically and strategically about the meaning of “broad” as our field conducts future-oriented research on learning and teaching technologies. Our prior [Cyberlearning 2019 convening](#) revealed why broadening the diversity, equity, and inclusion efforts within our research projects is so essential. [CIRCLS’21](#) provided multiple, highly interactive opportunities for attendees to work together on how the field can make stronger progress by examining and remaking “broad” and lead to greater impacts.

Process Summary

With more than eight hours of virtual meetings over two days, 300 attendees worked toward strategies to remake broadening. Two exceptional keynotes and discussions, illustrated below, anchored the proceedings.







The figure below illustrates the overall process of the meeting. After convening the community with welcoming remarks from CIRCLS and NSF leaders, attendees participated in a series of sessions to meet colleagues, share expertise, and envision future research together. Two keynotes framed the theme of remake broadening. After the second keynote, attendees worked together in 11 breakout sessions to articulate specific strategies for broadening. These were reported out in a town hall.

CIRCLS '21 | REMAKE BROADENING

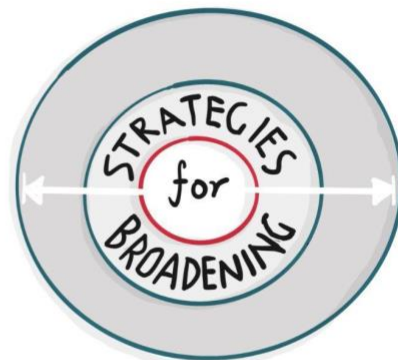
OUR STORYLINE



1 MEET COLLEAGUES

2 SHARE EXPERTISE

3 ENVISION COLLABORATIVELY



OUR THEORY of ACTION

MEET & BELONG

PARTICIPATE & INTERACT

ADVANCE & SHARE

Overall Strategies

The CIRCLS community prioritized committing to and enabling these overall strategies, which inform the specific recommendations on other pages. (Note: although there are both four overall strategies and four recommendations, a one-to-one mapping is not intended).

1. Redistributing power to those impacted by changes in teaching and learning.

For example, involving students in determining what and how an AI agent could help them and involving teachers in what “transparency” of AI algorithms means to them.

2. Shifting metaphors from broadening towards empowering.

“Broadening” has roots in technology transfer (and multi-phased scaling from research labs to widespread use). “Empowering,” on the other hand, has roots in social activism, and more clearly recognizes, for example, that capacity building, community building, and growing networks matters.

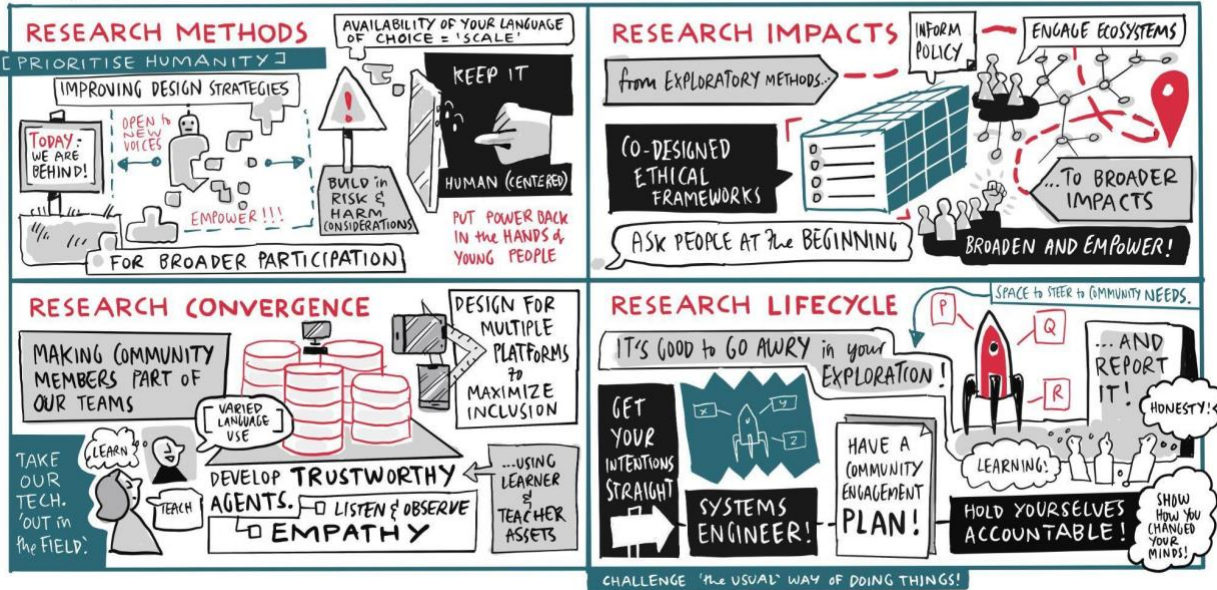
3. Aligning exploratory research to the scale and context of disparities.

For example, how to balance a portfolio across promising yet expensive, clunky technologies vs. scale-ready and highly improvable technologies.

4. Increasing accountability to equity goals.

Researchers have a great deal of experience creating data collection instruments to measure how effective our interventions are at achieving certain outcomes such as learning disciplinary knowledge or changing attitudes and interests. We need to use those same skills to ensure that our interventions and our own practices reflect the ethics and values of equity and justice for those involved in our research.

In a series of workshops, participants discussed specific strategies that remake broadening in research methods, research impacts, research convergence, and research lifecycle.



Preparing Researchers

CIRCLS'21 participants recommended changing how researchers are prepared. Researchers should be prepared for research that balances considerations of use and fundamental knowledge; prepared to be good partners; prepared for multidisciplinary teamwork; prepared to set and measure equity-relevant goals; and prepared to expand *who* is included as a researcher. See the image and narrative below for more information.



Selecting Research Opportunities in Pasteur’s Quadrant

The community is concerned that researchers may be inclined to select research problems or opportunities that value theoretical or technological novelty over the potential to make a positive difference in the real world. A revised definition of “innovative” would consider the possibility for highly valuable change in a large community of practice. To define problems to investigate that are “fundamental” in one’s discipline yet “powerful” in a community requires researchers to ask what the community’s most pressing questions are and listen.

Frameworks for Setting Goals, Assessing Learning, Evaluating Approaches

Calls to action use a variety of terms that include justice-centered, human-centered, responsible AI, fairness+accountability+transparency+equity (FATE), inclusive innovation, and value-sensitive design. Researchers need to grow in their ability to understand how to go from the broad call of action to the design of a specific exploratory research project, which includes not only the vision for the project but

also how student or teacher learning would be assessed within it, and how the promise of the focal technology design can be evaluated. Although frameworks exist—e.g., [value-sensitive design](#), [conjecture mapping](#), [culturally responsive evaluation](#)—how to engage these frameworks while doing specific research is more aspirational than everyday practice.

Multidisciplinary Refinement of Key Equity Concepts

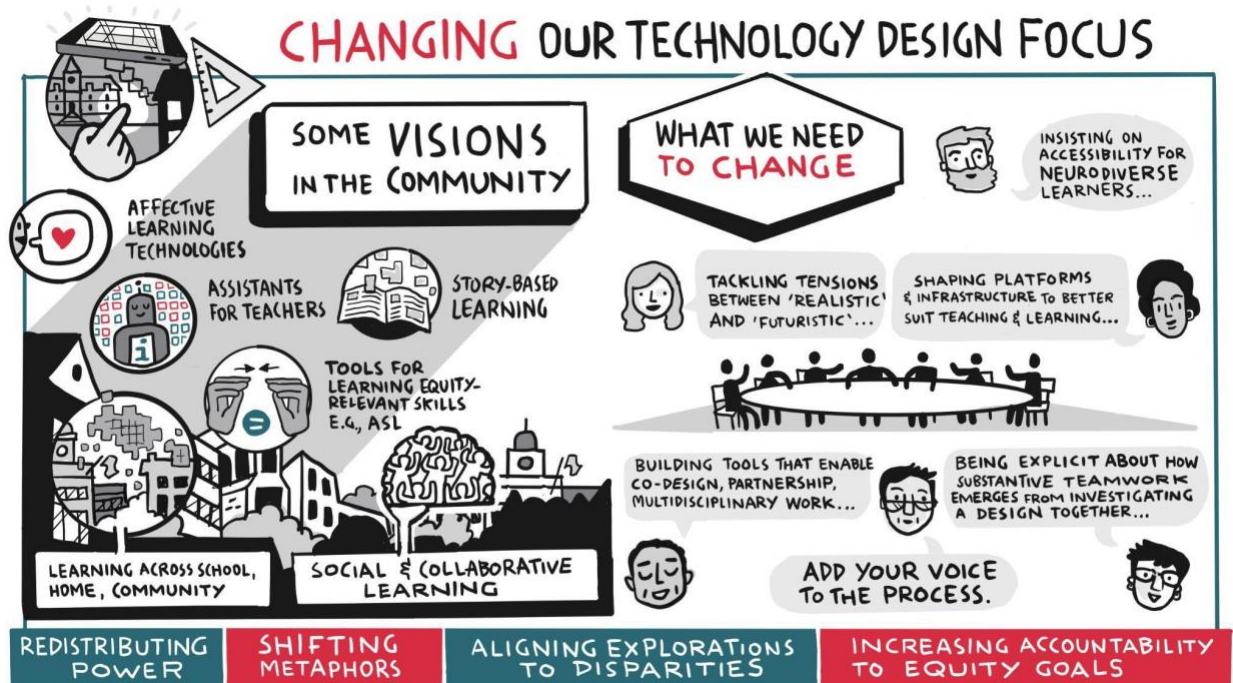
Participants recognized that within computer science and AI, concepts like bias, fairness, and transparency are still in their early stages. Although the scholarly discourse in education and in learning sciences on these topics may be somewhat longer standing, there is still a lot of room for growth in how learning scientists are trained to work with similar concepts such as bias, cultural responsiveness, and student voice inclusion—especially as these concepts are invoked while exploring new designs for learning technologies.

Preparing to Be a Good Partner

The community recognizes that partnering with others is challenging and many researchers are under-prepared. This includes the challenge for computer scientists of partnering with learning scientists (and vice versa) as well as challenges of partnering with communities that would use or be affected by new technologies. Foci for learning for researchers before they engage in partnerships could include communication practices, listening practices, understanding and mitigating power differences, and practices that develop empathy and cultural competence. Our community is responsible for developing the next generation of scholars and has the responsibility to make sure that the ethic of inclusion of diverse stakeholders in research and collaboration with peers and practitioners is clearly communicated and expected in dissertation research, valued in job applications, and used in early-career evaluations.

Changing the Design Focus

CIRCLS'21 participants recommended rethinking the focus of design-based research. Future design-based research should insist on accessibility, tackle tensions between realistic and futuristic technologies, develop tools that improve the process of co-design, and leverage platforms so that designs might more readily scale. As particular innovations proceed from more exploratory research programs like RETTL to more implementation-oriented research programs, the scope of the design focus will necessarily need to address a more comprehensive set of concerns.



This research community called for centering the voice of partners in choosing the focus of a research-based technology design project, as discussed above. This is fundamental and is elaborated across the key points below.

Insisting on Accessibility

Accessibility guidelines are well established but too many exploratory research projects do not address them. Neurodiversity is important to consider and accessibility needs to be addressed from a project's conception, and viewed as a necessary component rather than an optional "nice-to-have."

Realistic Usability and Multilevel Explorations

Researchers worry that too much exploratory research is devoted to expensive or “clunky” gear. Obviously, there is tension here, because technologies that will be commonplace in ten years may be expensive now. The community sees value in a pattern of exploratory research that might look at an overall concept in several different renderings—some which have less fidelity to the vision yet are more usable today and others that have greater fidelity, but are more cumbersome or expensive. Although the expensive version may have more fidelity in one way, what we learn about the concept may be broader if stakeholders can use it more easily and often. So, there could be a benefit to exploring the same concept at different “entry points.”

Exploring With Platforms and Infrastructure

Community members suggested focusing more attention on how innovative explorations could occur within platforms or with infrastructures that are broadly supported in the world, rather than building platforms from scratch within the limited funding available in exploratory research programs.

Improving Partnerships

CIRCLS'21 participants recommended improving how researchers partner with communities in which emerging technologies for teaching and learning will be used. Researchers should commit to partnerships early in their projects and seek partnerships that last longer than a three-year project cycle; they should listen in order to transform their work; they should value what communities are already doing and use co-design processes to incorporate community assets; and they should value capacity building (and capacity limits).



In a shift to the social activism model (empowering) from the technology transfer model (broadening), there was a strong call across most strategy sessions about involving communities of teachers and learners early in the research process, listening to them, and yielding more power to their voices while making decisions about what technology designs merit exploratory research and which questions about the novel technologies deserve priority. Researchers' view of who to partner with was very broad—students, teachers, parents, policymakers, school leaders, community center leaders, museum staff, and other stakeholders might all be viable and important partners.

Committing to Early, Mutual, Lasting Partnerships

Community members observed that we need to form mutually beneficial, long-term partnerships to ensure our work has a meaningful impact. Getting feedback from teachers on instructional materials or research instruments is not a partnership—that is asking participants to provide a service to the researcher with little to no benefit for the participant. A research partnership requires that the researcher starts by learning about and understanding the needs and interests of the partner organization or participants and commits to exploring those together.

Listening to Transform

Researchers at the meeting reflected on their own experiences when listening to student voices, working closely with teachers, or connecting with leaders and policymakers and how these experiences completely changed their view of the problem they were trying to solve. They realized they may extrapolate from their own experiences of teaching and learning in ways that do not fit what today's teachers and learners want—and this may block progress toward broad equity goals. Conversely, they reported excitement and challenges resulting from deeply listening to partners for ideas that could transform their intended exploratory research.

Valuing What Communities are Already Doing

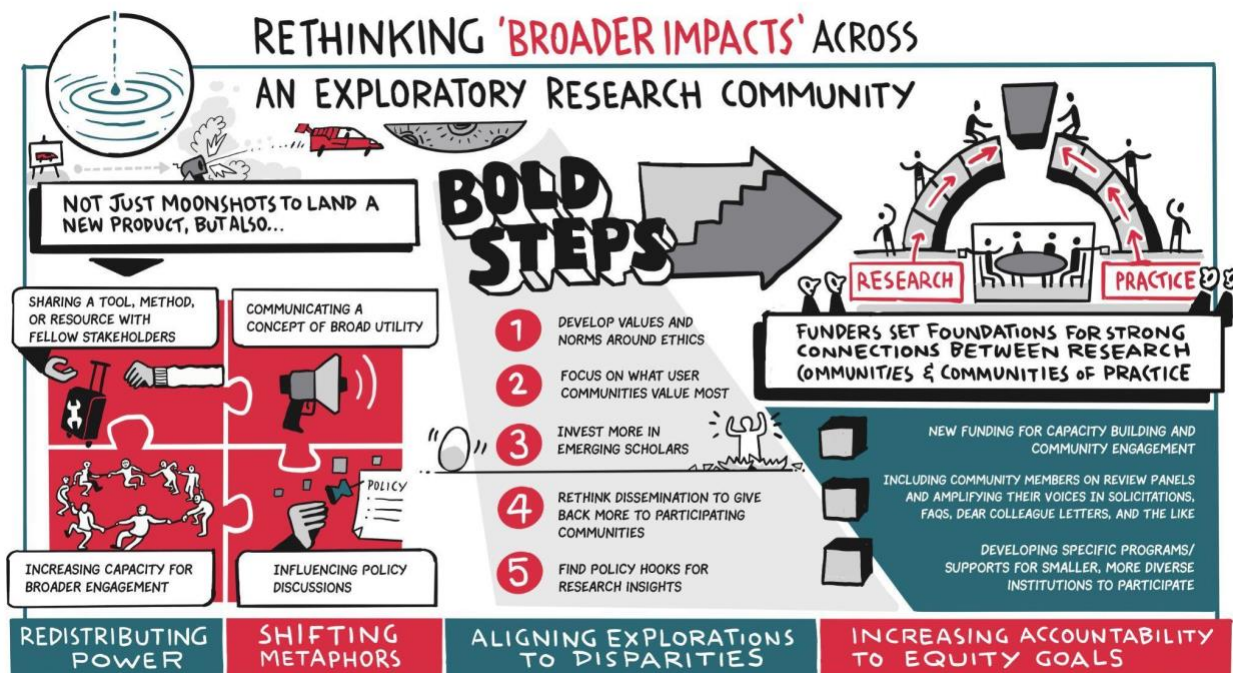
Some of the most important work in building capacity for local communities to achieve self-identified goals is already happening by stakeholders in those communities. The community may have the greatest impact by putting our skills in the service of those stakeholders. Our community can benefit as much from learning about what these communities are doing as they can from disseminating information about their own work.

Valuing Capacity Building

Researchers in this space recognize that when they work with partners, they have to focus on giving something valuable to the community with which they work. Because their exploratory prototypes may not be ready for prime-time even at the end of their project, the work they do to build capacity in communities of practice to solve problems that the community cares about has to count as a valued outcome of doing partnership work. One outcome of valuing capacity building could be the emergence of regional hubs or networks that work over long periods of time with researchers on issues related to emerging technology. Another outcome can be to help partners lead dissemination efforts and outreach to policymakers.

Rethinking Broader Impacts

CIRCLS'21 participants can take five bold steps to achieve broader impacts: (1) develop values and norms around ethics; (2) focus on what user communities value most; (3) invest more in emerging scholars; (4) rethink dissemination to give back more to participating communities; and (5) find policy hooks for research insights.



CIRCLS participants realized that in an exploratory research program, such as RETTL, the goal is not to get from a proposed idea to the launch of a comprehensive new product. Even in other NSF-funded programs, which fund research goals beyond exploration, launching a comprehensive new product by the end of a research program may not be realistic. Yet, however, if launching a great new app is off the table, what kinds of “broader impacts” can be achieved. Four possibilities, indicated here, are:

1. Building a tool or resource that others in your design and research community can leverage, for example, a tool for specifying additional designs or a resource for evaluating related designs.
2. Communicating a new concept of broad utility, such as how learning technologies can support embodied interactions.
3. Increasing the capabilities of the people you work with (e.g., teachers, students) to play a strong role in additional design and research work.
4. Developing evidence or an argument that can influence policy discussions, for example, about the opportunities or risks of a particular learning technology.

Across these and other broader impact goals, we see strong relationships between research communities and communities of practice as essential. While the CIRCLS community can offer many examples of successful partnerships, they also called for more funding for community engagement, including community members as “peers” in the peer review process, and developing mechanisms to get smaller or more diverse institutions involved in exploratory research.

The five bold steps, discussed above, are essential to strongly linking the concept of “broader impacts” with the concept of “community capacity building.”

Call to Action

We invite members of the CIRCLS community and beyond to tell us about how you are taking action to shift from broadening to empowering. We welcome your comments and thoughts via [this form](#).

In addition, here are some specific opportunities for action that are currently available:

1. Become a [RETTL reviewer](#), so you can directly provide input on proposals aligned with our community's vision and learn more about the [RETTL awards](#).
2. Join one of our [Expertise Exchanges](#), a hub where researchers, graduate students, teachers, and other education stakeholders can connect and share knowledge.
3. Write a [Rapid Community Report](#), a brief, informative, peer-reviewed, citable, open access publication that contributes to both the research community and broader audiences.
4. Share [this report](#) with your colleagues and friends! Follow us on [Twitter](#) and connect with us on [LinkedIn](#) for more updates.
5. Explore the [CIRCLS'21 convening website](#) to learn more about the event.