



Shifting from “broadening” to “empowering”: One community’s perspective on changing the learning sciences

Jeremy Roschelle, Digital Promise, jroschelle@digitalpromise.org
Wendy Martin, Education Development Center, wmartin@edc.org

Abstract: The ISLS theme addresses “global perspectives on equity and justice that promote the empowerment of educational innovation for all.” We report on a large virtual convening (n=310), where learning scientists, computer scientists, and educators in one country considered how research should change to address equity and justice. We report on the output of working group strategy sessions and a culminating discussion that elicited “bold steps” for change. Our analysis of bold steps submitted by eleven teams led to re-grouping by the actors involved: (1) researchers, (2) partnerships, (3) technology design, and (4) community values should each change. For each group, we report key themes. We note limitations and broader implications (e.g., what a shift to language about “empowering” implies). Conducting similar meetings in other regions and reporting complementary outcomes could be powerful.

Introduction

The 2022 ISLS conference theme focuses on a wave of change in the learning sciences that is bigger than any one research project, theory, design, or finding: our society seeks to spur transformation of our work to value diversity and drive toward equity and justice. What does this transformation entail? In an unsatisfactory view, it could mean highlighting aspects of what we already do that relate to equity and justice, without much change in how learning scientists are prepared, how they form research teams, how their values translate into action, or in their design focus. Or it could mean that every individual researcher and team must figure out what the desired transformation means in their own unique work—with a community or society role only in providing a forum to report insights and findings. We find transformation only as individuals or in isolation to be untenably hard and ultimately insufficient. Our work is situated within larger systems that reinforce specific ways of doing things. For real change to occur, change also must occur at the system level (as well as at more local levels).

Through our role in a research hub that hosts a national convening of researchers who do learning sciences and innovation work, we sought to organize a two-day virtual convening that would elicit a community-wide prioritization of how our work should change. While our convening was necessarily localized to our context, we hope to make two contributions by reporting on its process and outcomes: (1) to share a virtual community-wide process that others could enact in their regional communities and (2) to share tangible recommendations for change that may contribute to discussion about a society-wide course of action.

Background

In the United States, as in many other countries and regions, government funders of learning sciences research make awards that create a portfolio of related projects. Later, they often host convenings across the portfolio of projects to bring together the teams and to cross-fertilize findings. At convenings, teams discuss their work, identify synergies, and discuss next steps. The authors have been leaders in a nonprofit collective that organizes and hosts such convenings on behalf of the government funders; we have run convenings for one particular portfolio of learning sciences research for about a decade. The portfolio focuses on the “future of learning” and requires computer scientists and learning scientists to collaborate in exploratory research. Over the decade, we observed a shift in the focus of the research community that attends these convenings. The focus of conversation shifted from mostly technical discussions of research about future learning environments to a broad interest in equity and then to a sense of a “call to action”—that we should more directly focus research to address equity (Roschelle et al., 2017). In preparing for our 2021 convening, we organized a program committee of stakeholders in our regional research community and asked them what the central theme of the convening should be. They strongly recommended a thematic focus on the *how* and not just the *why* of promoting equity and justice in our research. We developed a program for the convening to emphasize this theme and to produce collective recommendations for *how* we should change. Approximately 350 individuals registered for our convening and 310 attended. The convening was held virtually for eight hours spread across two days. We report further details on how we organized the program and collected outcomes and other data next.

Before continuing, we acknowledge other important forums where similar ideas are being discussed. Our society now has an Equity and Justice Committee, for instance. Our publications include seminal equity-focused papers (e.g., Gutierrez & Jurow, 2016; Jurow & Shea, 2015; Muller, 2004). Other regions of the world have their

own forums to organize researchers around equity and justice. We are aware that we offer just one perspective, grounded in a particular set of circumstances, and that we report on just one relatively short event. By sharing what we learned, we hope to learn about and combine with complementary and contrasting perspectives from other places.

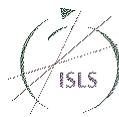
We also acknowledge upfront that our process did not converge on one outcome, nor did we converge on one definition of equity. We have observed different foci for equity in our research community, including students with disabilities, students in poverty, students in rural areas, and—of great importance in the United States—students who have experienced racism. We believe it takes more than a single virtual convening to get an agreement on a definition of equity among such a large group of projects, each of which tackles different aspects of the challenge. We chose not to try to wordsmith definitions during our convening, but to focus on prioritization of bold steps and other recommendations our program committee believed we could accomplish in the time available. (A further limitation of which we are acutely aware is that there is scholarly precedent for almost every point raised during our convening, but we could not possibly systematically cite all the relevant prior work and stay within the 8-page limit).

Methods

The convening that we describe in this paper had the theme of exploring how a research community can have a broader impact by reassessing fundamental aspects of its work. With an internal hosting team and an external program committee, we designed a program that had a storyline: we would get to know each other as a community (leaders from different projects often do not have strong relationships), work together to educate ourselves about the theme, and then develop prioritized bold steps for how we could change our work. Overall, our community process follows the method of “forming, norming, storming, and performing.” (Tuckman, 1965) Due to the nature of the event as serving a national funding agency, we also allocated time for necessary announcements and informational updates about new funding opportunities and for roundtable sessions and poster sessions where participants could give updates on their work. To launch the theme, we invited two keynote speakers who addressed issues of equity and power in computer science, artificial intelligence (AI), and educational technology. Nicki Washington (2020) discussed how the culture of computing often marginalizes Black and Latinx students, and how we need to explicitly help students in computer science programs create a sense of identity and belonging in that community. In Figure 1, we show a graphic illustration that was created “live” as the first keynote speaker spoke. In keynote 2. Craig Watkins (2018, 2019) discussed his work with Black and Latino students and young professions in STEM and technology, and the nature of specific opportunities and supports that enable their growth and success. These keynotes offered sharp contrasts between meaningfully addressing equity and just evoking it at a surface level, giving participants food for thought. We engaged with a graphic illustrator throughout the meeting to capture and share what was being said and to spur further deliberation and reflection.

Figure 1. Graphic illustration of Nicki Washington’s keynote address





In other sessions, such as “expertise connection” sessions and talks on specific research projects, we asked presenters to orient their presentations around the idea of rethinking how we include, reach, and support diverse communities in our work. Near the end of the convening, we asked participants to work in small groups to draw on what they learned and heard over the course of the convening to come up with strategies for thinking about new ways for our work to have a broad impact. The small groups focused on different aspects of our community’s research and development work. Some examples of groups included:

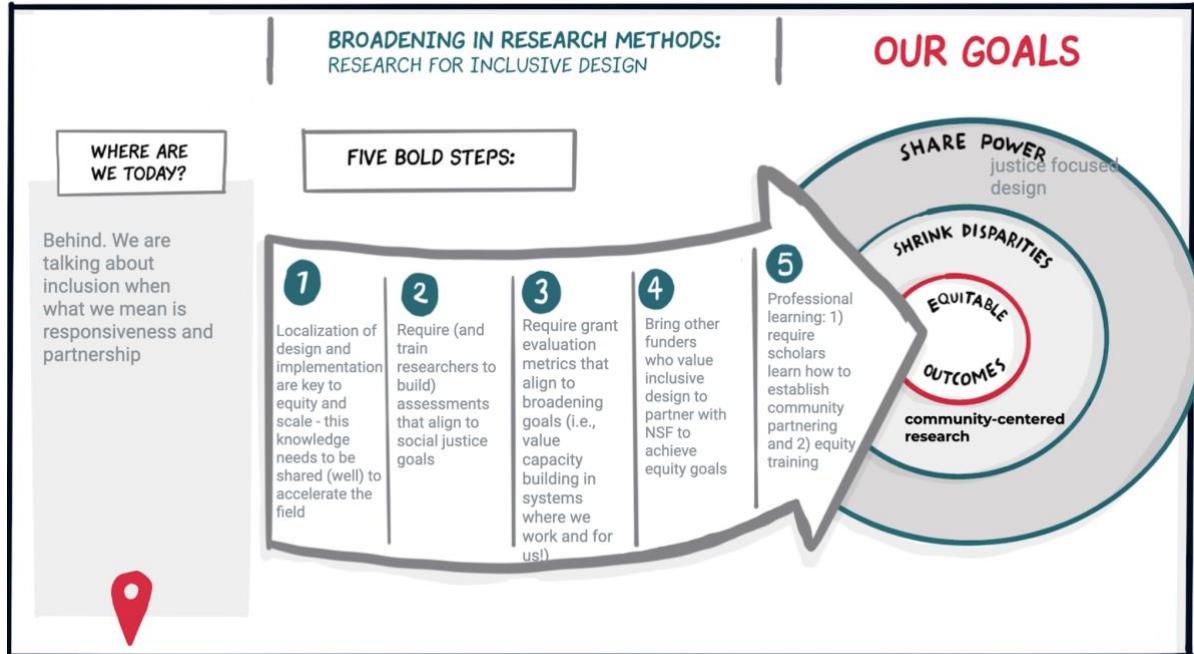
- Research for inclusive design
- New human-technology interactions
- Learning analytics
- AI in education policy
- Communication and dissemination

The groups were asked to discuss where the community is *now* in terms of having a broad impact in relation to their topic and what our *goals* are, and then come up with five *strategies* for getting the community to where we want to be. They made their recommendations on Jamboards. Then we had a “town hall” session to report out with the graphic illustrator. As groups each reported a first idea from their group in a round-robin format, the illustrator captured the emerging recommendations of the collective. A panel commented on these ideas and asked follow-up questions. The effect was of a voice-only panel whose ideas were appearing in an illustration in real time, which was captivating to watch and participate in. Over time, the conversation was opened to everyone present, and they were invited to add ideas via chat.

Data collection

Ideas from the small groups were documented in two ways. Initial brainstorming was recorded on post-it notes on a Jamboard under the headings “Where are we now?” “Bold steps” and “Goals.” The groups then had to prioritize and consolidate their ideas so that they could be put into a second Jamboard that had a graphic illustration as its background. (See Figure 2.)

Figure 2. Sample completed small group Jamboard



In addition, we also conducted an evaluation survey that was distributed via email after the convening to get feedback on the event as a whole as well as on the different sessions.



Data analysis

Members of the convening organization team analyzed the data from both Jamboards from all eleven of the small groups. The analysis used a grounded theory approach (Strauss & Corbin, 1990), in which we read through all of the post-it notes on the brainstorming boards as well as the finalized ideas presented by the groups on the graphic boards and identified key themes that emerged from the data. A draft of these themes was created in which the community's ideas were categorized according to the various ways the work of the community could change for broader and more meaningful impact to be realized. The categories that arose were:

- Changing how researchers are prepared
- Improving community partnerships: valuing assets and knowledge
- Changing our technology design focus
- Rethinking broader impacts across the research community

These categories, along with the supporting descriptive data, were shared with the entire research team, who then reviewed the Jamboards and contributed clarifications and refined the analysis. Evaluation surveys were analyzed using descriptive statistics. There was a response rate of 25% for the survey (79 respondents out of a population of 310).

Findings

The analysis of the evaluation survey showed that 85% of the respondents agreed that they gained a new perspective on how to reassess what we mean by “broadening impact” from the meeting. The analysis of the Jamboard data revealed that our research community had many ideas for strategies to change the way we think about research and development. They recognized that we need to reflect on our practices and norms at multiple levels if we are going to transform how we conceive of broadening impact in our work.

How researchers are prepared

Community members across most of the groups pointed out that we need to examine how we ourselves are prepared to conduct research and how we prepare the next generation of researchers. We are the first agents of change in this larger process of transforming the community's values and practices. Small group participants acknowledged that they were under-prepared for the work that comes into view once we center equity and “remaking broadening.” Our analysis identified a set of key ideas about what researchers in this field wanted to change (see Figure 3).

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 difference in the real world. Consequently, our exploratory research may learn a lot about technologies that have no realistic chance of making large-scale contributions to an equitable society. A revised definition of “innovative” would consider the possibility for highly valuable change in a large community of practice. Likewise, training may overemphasize collecting one's own data over leveraging larger scale data sets that already exist. To define problems for investigation that are “fundamental” in one's discipline yet “powerful” in a community requires researchers to ask what the community's most pressing questions are. This is not currently a typical starting place.

Frameworks for setting goals, assessing learning, evaluating approaches

The community does not want to focus on technology itself nor only on contributions to research journals that follow well-trodden paths. 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, learning how to engage these frameworks while doing specific research is more aspirational than everyday practice. As one community member wrote, we need to “identify new learner outcomes of interest (which include equity) and instruments that measure these outcomes.”

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 like bias, cultural responsiveness, and including student voice—especially as these concepts are invoked while exploring new designs for learning technologies. A multidisciplinary approach to tackling any of these problems is still very novel and almost everyone in the field must learn to do it well.

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. More discussion on partnerships will come up in the next section.

Figure 3: This illustration (one of several) highlights proposed changes in how researchers are prepared.



Improving community partnerships: Valuing assets and knowledge

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 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 start by learning about and understanding the needs and interests of the partner organization or participants and commit to exploring those together.

Listening to transform

Researchers at the meeting reflected on their own experiences where listening to student voices, working closely with teachers, or connecting with leaders and policymakers completely changed their view of the problem they were trying to solve. They realize 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 towards broad equity goals. Conversely, they reported excitement and challenges resulting from deeply listening to partners for ideas that could transform their intended exploratory research.

Value 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 we can from disseminating information about our 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 they work with. 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.

Changing our technology design focus

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 points below.

Insisting on accessibility

Accessibility guidelines are well established but too many exploratory research projects do not address them. 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 of exploratory research is devoted to expensive or "clunky" gear. Obviously, there is a 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 which 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

There is a limit in how far we can get when each project tries to design its own complete experience. Community members suggested focusing more attention on how innovative explorations could occur within platforms or with infrastructures that are broadly supported in the world.

Rethinking broader impacts at the research community level

The attendees were also cognizant that the research community is structured in fairly set ways, and that they need to consider how community-level roles and processes must be addressed as we "remake broadening." This can include what we value in peer review of proposals, what we consider publishable in journals or presentable at conferences, what we see as the community's outputs or products and how we structure research projects.

From "moonshots" to focused substantial advances in practice



A challenge for researchers in our community is that exploratory research projects often last for only a few years and are funded at relatively low levels, making broad impact difficult. Progress can be made not by sweeping this challenge under the rug but by greater clarity about the kind of impact an exploratory project can have. Taking a risk to make a substantive or radical change in practice for one school/group/organization rather than reaching a large number of people might be a more appropriate outcome for an exploratory project. Designing processes so that students, teachers, and other stakeholders can contribute to deliberations about the future of learning with technology can count as a meaningful impact. Finding ways to elaborate a concept like “bias” so that computer science, learning sciences, and educator views are all respected can be seen as a broad impact. Creating tools and methods so that partners can look at the transparency of an algorithm could count. Depth of transformation can be changes in the researchers' own practices. Having the community commit to reviewing proposals and their peers' work with this definition of impact in mind would itself lead to transformation in the field.

Values around ethics and risks

Norms and values typically are developed by communities and reside at a community level. Our research community recognizes that “high-risk” research should be valued as we explore technologies that are ten years out, but we also need to be mindful that those who might be harmed must be consulted before we can determine what an appropriate risk is. Similarly, the use of big data or AI in learning technology projects carries risks to privacy, security, and more. When technologies are tested in partnerships that use them with teachers and learners, there are ethical considerations. Our community should insist that, from the onset of a project, researchers must involve local stakeholders in discussions around risks.

Sharing tools and processes for co-design, co-analysis, and partnership

Some members in our community have been engaging in co-design and collaborative analysis of data with local partners for a long time and have learned many lessons about how to do it effectively. The tools and procedures for doing this kind of work should be shared within our community and with our partners so that they can be used more broadly and improved through regular, iterative use. The same emphasis that the research community has given to assessments and data collection instruments should be given to protocols to support effective co-design, co-analysis, and productive partnerships.

Reconceptualizing dissemination

This community repeatedly expressed the need to disseminate research findings to communities of practitioners, local stakeholders, and policymakers rather than the typical academic communities that are primarily valued by funders and tenure review boards. With limited resources in terms of funding and time, expecting researchers to do this kind of outreach in addition to what is already expected is unrealistic. Our community needs to be part of the effort to change incentives around what is shared, how, and where. Members of our community are not only researchers, we are also the people who review proposals and articles, hire new faculty, serve on tenure review boards, and create dissemination plans. It is this community’s responsibility to place a higher value on reaching practitioners, local stakeholders, and policymakers than traditional academic audiences. We also need to encourage our partners to engage in dissemination and ensure that the materials that we produce are available to teachers, learners, and communities long after research is completed.

Implications

The analysis of our research community’s discussions illuminated the specific directions we want to take. Regardless of whether the small groups were talking about AI, inclusive design, or communication and dissemination, larger themes bubbled up, in part no doubt because of the community’s values but also possibly because of the calls to action made during two provocative keynote addresses. A willingness to look at our community critically was a strength of the small group conversations. There was a clear interest in generating practical ideas for moving forward and getting to work. Many of the specific strategies are elaborated above. We intend to plan further activity to move these strategies into action.

From broadening impact to redistributing power

Given that the convening was designed to reassess what we mean by “broad impact,” it is perhaps fitting that our final sessions led us to realize that maybe having a broad impact should not be the goal at all, but rather we should be striving to empower others to make their own impact. Time and again community members stated that we need to value capacity building as a key outcome of our research. Even more important, we need to step back and honor the capacity that already exists in the communities we work with and see our role as collaboratively designing the research strategy that will support that community’s efforts to achieve the goals they already have. Coming up



with an innovative application of emerging technologies to address a problem that we ourselves identify and then sharing that innovation with other academic researchers has up to now been how we conceive our work. The contributions of our community members indicate that we need to rethink many of these assumptions about who identifies the problem, how we design the innovation, and what kind of sharing is most meaningful and effective.

Aligning exploratory research to the scale and context of disparities

The systemic problems in education and the larger society that the convening keynote speakers and our community member discussions surfaced are not going to be solved by any one research project or even our collective projects. However, the kind of exploratory research that our community engages in has the potential to take bold steps that are necessary to make meaningful changes in the communities where we work. Smaller-scale, high-risk projects can test innovative approaches to integrating technology into learning environments that larger-scale projects might not be able to. We as a community need to realign our expectations of exploratory research so that we can make the most of what it is most suited for.

Strengthening our own accountability to equity and ethics 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. We as a community need to support each other in this effort by co-creating and sharing tools to gather this kind of data and preparing both experienced and emerging researchers to do this work and hold each other accountable for living up to these principles. The systemic change that we hope to see requires a mutually supportive and accountable set of expectations for how we do our work.

By sharing our process and findings, we hope to inspire others to orchestrate convenings in their regions to arrive at a community-level agreement on bold steps, and to share their bold steps so that as an international community, we can converge on practices, values and goals that reflect what we hope to achieve.

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