# Using Technology to Foster Equitable Access and Diverse Learning Communities

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## Rapid Community Reports

### Workshop Outcomes

Digital Promise
Accelerating Innovation in Education

ISLS International Society of the Learning Sciences

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# Using Technology to Foster Equitable Access and Diverse Learning Communities

*The International Alliance to Advance Learning in a Digital Era hosted workshops on ways to leverage digital technology to promote equitable access to learning.*

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## Abstract

Educators and learners worldwide turned to technology to continue teaching and learning during the pandemic. A partnership among research societies, the International Alliance to Advance Learning in a Digital Era, convened a public engagement event to highlight key lessons and practical issues for education policymakers and educators who want to create more inclusive learning environments and foster equitable access to learning opportunities using technology. The event interactively engaged more than 100 researchers, administrators, and policymakers. A key finding was that while the pandemic inadvertently deepened issues of equity and inclusion, it also demonstrated opportunities to use technology to foster access and diversity. The authors discuss these opportunities and raise questions that still need to be answered.

## Keywords

Education, equity, digital technology, quality, inclusiveness

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# Overview

During the pandemic, the International Alliance to Advance Learning in a Digital Era (IAALDE) convened a public engagement event consisting of several workshops. A goal of one of the workshops was to highlight key lessons and practical issues for education policymakers and educators who want to create more inclusive learning environments and foster equitable access to learning opportunities using technology.

This workshop was motivated by recent events that impacted education on a global scale. In particular, the United Nations Sustainable Development Goals report from 2021 described the COVID-19 pandemic as "catastrophic" for education. It caused 100 million children to fall below the minimum reading skill threshold worldwide, with the poorest and most vulnerable communities bearing the brunt of these losses. As schools pivoted to online instruction, teachers were overwhelmed by the need to get their content online quickly and struggled to learn and implement best practices for effective and inclusive online learning. Many students also found themselves unable to engage in their courses due to a lack of Internet access or home computers (van de Werfhorst, 2021). These events have highlighted the ways in which the digital divide impacts educational outcomes in lower-resourced communities. The underlying issues of educational equity are not new; they have existed in countries around the world, and the pandemic has only exacerbated their consequences (Engzell et al., 2021). However, the disruption of normal educational practices also showcased opportunities that digital technology offers to enable more equitable learning (Kizilcec et al., 2021a; McCarthy et al., 2022).

The workshop was grounded in an understanding of the state of the art. Experienced educators have been using digital technologies effectively for decades to foster the development of learning communities; for example, using open educational resources, online learning platforms such as learning management systems, and learner-centered pedagogical strategies such as project-based learning. We already know a lot about how to help diverse learning communities thrive, including concrete and actionable models for effective teaching practices that leverage technology and the internet (Loreman, 2017). Now that an entire cohort of instructors and students are familiar with using technology for teaching and learning, there is an opportunity to help them use it more effectively going forward. The question is not whether to use digital technology in teaching practice, but how to use it effectively to reduce inequities and accommodate diversity.

# Workshop Attendees

The workshop project grew out of a collaboration among twelve research societies participating in IAALDE[1], an international partnership involving nearly 3,000 researchers worldwide. This academic meta-society pursues two primary objectives. The first is to raise the level of awareness and impact of each of the component research societies by sparking cross-pollination through a practice of inviting authors that receive a "Best Paper" award at the main conference of the society to present the work at one of the other participating conferences. The second goal is to provide mechanisms through which the community can integrate findings across societies to build an integrated picture of the state of the field and to speak to audiences of educational policymakers and practitioners.

To advance the second objective, this community organized the workshop to address the question: *What does it mean for a meta-society like IAALDE, which is dedicated to basic research, to engage in partnership with the worlds of policy and practice?* More than 100 researchers, administrators, and policymakers in education were invited to grapple with this question through panel discussions, break-out working sessions, and whole group discussions. The overarching goal was to accelerate the pace of research having real educational impact through practice. In particular, 23 experts representing ten of the twelve partnering research societies were divided into three expert panels dedicated to a specific topic. The panel topics were *Learning as a Cognitive Process*, *Situated Learning Across Contexts*, and *Equitable Access to Knowledge, Education, and Learning Environments*. Researchers in attendance were a diverse and international group of leaders across the fields of education, learning sciences, instructional technology, learning analytics, human-computer interaction, and artificial intelligence, each nominated by the research society they represented.

# Workshop Structure

The workshop began with a focus-setting panel, where the lead panelist from each of the three later panels briefly gave an overview of the specific expertise the participating researchers represented. The audience ranked the topics for each panel using an interactive system. Based on the ranking, a set of six break-out sessions (two per panel) were earmarked to focus on the highest-ranked topics. Other panelists were assigned to the topics that were closest to their expertise. Workshop participants then

[1] International Society of the Learning Sciences (ISLS), International Artificial Intelligence in Education Society (AIED), Society for Text and Discourse (ST&D), International Educational Data Mining Society (IEDMS), European Association of Technology-Enhanced Learning (EATEL), Society for Learning Analytics Research (SoLAR), ACM Learning at Scale (L@S), Association des Technologies de l'Information pour l'Education et la Formation (ATIEF), ACL Special Interest Group on Building Educational Applications (SIG EDU), Asia Pacific Society for Computers in Education (APSCE), Association of Smart Learning Ecosystems and Regional Development (ASLERD), Global Chinese Society for Computers in Education (GCSCE)

selected a break-out session to participate in. Within the breakout sessions, the participating panelists gave very short presentations related to their society's area of expertise and major practical insights. The subsequent discussion around the specific topics that appeared to generate the most interest focused on problem identification and exploration of potential solutions. This report focuses on the Equitable Access to Knowledge, Education, and Learning Environments workshop panel. Within this panel, the most support was expressed for topics related to reducing barriers to support equity, learning technologies and interventions to support large, diverse populations of learners, and optimizing human learning for all learners. This report synthesizes discussion within this particular panel

# Key Issues

## How can those with limited access to computers and the Internet benefit from educational technologies?

For educators and policymakers, the challenge of fostering diverse learning communities during a pandemic is daunting, but it is essential for serving a generation of students and learning how to respond to disruption in the future (Walton et al., 2022. The complexity associated with providing learning opportunities for out-of-school children was hard enough prior to the pandemic, with 258 million children worldwide without access to formal education (UNESCO Institute of Statistics). The pandemic has widened the scope and scale of access problems not only in the developing world but also in high-income countries, where technology provided a "lifeline" of connectivity and continuity for formal education (Stracke et al., 2022). This tension raises questions about how to extend the benefits of educational technologies to students with limited access to computers and the Internet. Which approaches that rely on affordable and accessible technology are effective alternatives? One example of an approach to enable affordable Internet access are community hubs, a public space where members of a community can share computers or tablets to browse the Internet. Another approach is to provide off-the-grid Internet access via localized web solutions, such as Project Lantern (a portable wireless device to connect people and share information without internet access) and offline mobile phone apps. Educational applications can be designed and implemented for use in community hubs and off-the-grid settings to serve disadvantaged students.

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## Under what conditions can technology improve education and reduce educational inequalities?

The promise of education technology has been a point of contention and debate for decades. Some researchers have argued that technology can improve access to learning opportunities and provide personalized feedback in ways that can reduce inequalities; others have argued that technology tends to benefit students who are doing well and leaves behind those who need help the most. There is empirical evidence to support both sides of the argument. In K–12 education, for example, the well-known *One Laptop Per Child* program and more recent initiatives to bring tablets into classrooms have failed to produce sustainable improvements in outcome to justify their cost; yet applications like ASSISTments that are designed to support teachers with assigning and grading math homework have been found to improve student outcomes, and especially for lower-performing students (Murphy et al., 2020). The key question is therefore not *whether* but *under what conditions* technology can improve education and reduce educational inequalities. A critical condition for success is buy-in from stakeholders, such as teachers, who need to see the value in adopting a new technology and trust that it will work as expected and does not inadvertently disadvantage students with older devices or low-bandwidth Internet connections.

## How can teachers make informed choices about which educational technology to use in their classrooms?

Educators and school leaders face an overwhelming number of options and not enough evidence-based guidance for choosing educational technology. It can be especially hard to determine in advance whether a new application actually promotes good practices for equity and inclusion, beyond what is claimed in marketing materials. Encouraging educational technologies to get certified by a What Works Clearinghouse for their effectiveness and equity could substantially aid educators and school leaders in these choices. Those in the educational technology space, and education more broadly, have become increasingly aware of the bias that occurs when a privileged few make decisions for many.

## How can emerging technology connect learning at home with learning at school?

As emerging technologies begin to bridge the gap between school and home, they encourage students to bring their "home knowledge" into their schooling, which invites families to become a part of their child's education. Family involvement is a strong contributor to student learning, but many (grand)parents feel anxious about their ability to help their children with their schooling. Technologies must not add more barriers to family involvement if older family members without technology skills feel excluded. New educational technologies should therefore provide scaffolds that support family involvement in their children's learning to help reduce inequities. To this end, technology designers need to perform user studies with parents in marginalized and low-income

communities to learn about the challenges that arise and how to design tutorials and instructions to make it easy for family members to take an active role in the learning process.

## How can technology design processes be improved?

While [a co-design] approach does not guarantee the effectiveness of an application, it ensures that the design responds to the real challenges faced by teachers, parents, and students.

Although many interventions and technologies are still developed by researchers or technology companies, there is a growing push to engage in more *co-design* with teachers, parents, and students and to be more intentional about the diversity and inclusion of a greater number of people. While this approach does not guarantee the effectiveness of an application, it ensures that the design responds to the real challenges faced by teachers, parents, and students. This significantly raises the chances that the application is adopted and used in teaching and learning practice.

# Recommendations for Future Work

Education research has helped us understand the nature of inequities and how the use of digital technology in teaching can facilitate learning opportunities for students who are underserved by the current system. Equity issues have profound effects on students' educational outcomes and life opportunities all over the world. Students from marginalized groups, including historically underrepresented people and those with lower socioeconomic status, are most negatively affected by systemic issues in educational resource allocations and home circumstances. Closing these long-standing gaps is a big challenge and opportunity for education policy and technology interventions.

An established problem with many technology-based interventions in education is that they assume a technology-rich or technologically-capable environment, but the reality in many schools and households all over the world is different. The digital rich and digital poor vary in their levels of connectivity, in what they are able to access, and the extent to which they can engage with educational content and communities. Educational technologies, therefore, need to be tailored to the actual context of schools and households in marginalized and low-income communities. In particular, educational technologies that are affordable, rely on widely available mobile devices, and seamlessly weave into existing teaching and learning practices are needed (e.g., Kizilcec et al., 2021b). Such technologies can help teachers provide their students with individualized, asset-based instruction and timely feedback by determining what students already know and building on their strengths. This helps students from diverse backgrounds feel more confident and willing to speak up, fostering a more diverse learning environment.

# Next Steps

This workshop was held during the COVID-19 pandemic and it assembled a diverse set of stakeholders in education to identify key issues and opportunities for using technology. Attendees at this workshop identified educational access as a pressing and growing problem and called for more researchers to get actively involved in addressing it. Among the many access issues that require research involvement, they noted the importance of affordable and accessible technology; supporting informed choice by educators; involving practitioners in the co-design of solutions; and understanding family-school connections. Deeper exploration in a follow-up workshop could define how researchers can increase their focus on these issues, and thereby better address their shared goals of achieving equitable access and supporting diverse learners.

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