2023 ISTE RESEARCH STUDY

TRANSFORMING TEACHER EDUCATION

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Education is at a once-in-a-generation inflection point that's allowing us to reimagine and redesign learning for the future. Recently, we've seen elementary and secondary classrooms become increasingly connected, with access to reliable internet, devices and apps. Educators have made strides in using technology for learning with help from professional development. And districts and states are developing digital learning plans to drive systemic change.

Data from a survey of new teachers conducted in 2022 showed that over half felt unprepared to use technology in the classroom, and slightly less than a quarter of them felt confident in their digital skills for teaching. The pandemic magnified the need to use technology for learning, and it raised the stakes for comprehensive educator preparation programs (EPPs) to ready future teachers for classrooms more connected to technology than ever.

Data from a 2022 survey of comprehensive EPPs has helped uncover both the gaps and pockets of success we can build upon. There are many examples of EPPs that are modernizing curriculum and faculty who are modeling effective digital pedagogy and collaborating with local districts to align goals around digital skills for educators. These programs can serve as vital exemplars that others can learn from.

This report outlines key findings and accelerators from the most comprehensive surveys to date to help us understand the needs and point to steps we can take to address them.

EPPs are crucial to designing an equitable and transformative future of learning. We hope you will join us in this important work!

Richard Culatta
CEO
ISTE/ASCD

EXECUTIVE SUMMARY

This research study sheds light on the contours of today's education preparation landscape, combining data from two seminal surveys conducted in 2022. ISTE deployed a first-of-its-kind EPP self-assessment survey to measure the breadth and depth of instructional technology in comprehensive teacher education programs. A total of 43 faculty members and leaders from 36 EPPs who signed the Digital Equity and Transformation pledge participated in the survey.

Additionally, a second study, conducted by Jenna Conan Simpson, Ph.D., explored the disparity between what new teachers learned and experienced in their EPPs and what they needed to succeed in digitally connected classrooms. The survey included a total of 214 teachers in their first three years in classrooms across the country, overlapping with school closures requiring them to teach online or in hybrid environments.

Although the audiences of the two surveys are not directly related, they collectively provide parallel insights into teachers' experiences before and after they reach the classroom. Our review of the research yielded 3 key findings:

1) **Over half of EPPs reported that most of their faculty incorporate technology.** 53.5% reported that most of their faculty incorporate technology. This data underscores the urgent need for greater faculty expertise in digital pedagogy to drive transformative change in how we prepare new teachers.

2) **Prior to entering the classroom, 56% of new teachers lacked confidence using learning technologies.** Without exception, new teachers expressed a desire for more experiences to build their confidence.

3) **Currently, 65% of EPPs are in the process of updating their curricula.** While nearly all EPPs reported using instructional technology frameworks, there is a need for greater breadth, depth and quality to facilitate preservice teachers' development of digital pedagogy skills.

Overall, these findings help us understand the current state of educator preparation—both what is going well and where changes are needed to future-proof teacher preparation programs so new teachers graduate with the abilities to infuse instructional technology effectively. By leveraging these insights, ISTE (International Society for Technology in Education), in partnership with the U.S. Department of Education's Office of Educational Technology (OET), can work collaboratively with EPP leaders, national associations, funders and policymakers to improve teacher preparation programs and support the success of new teachers.

INTRODUCTION

The promise of technology to fundamentally change how we teach and meet the diverse needs of all students has yet to be fully realized. To create learning experiences that tap into the power of technology to achieve greater equity and to transform education, teachers must not only understand how to use technology but also know when, where, how and why to integrate it. The critical tipping point for systemic transformational change in learning can only be achieved when a significant number of teachers possess the essential skills for the effective use of technology for learning.

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For decades, ISTE has been the leader in supporting educators in the art and science of using technology effectively for learning. While emergency remote learning during the COVID-19 pandemic failed to fully serve many students and led some teachers to be more skeptical about technology, we know that thousands of teachers leverage technology to inspire their students to learn every day. For example, the geometry teacher who uses satellite images of the earth to compare the area of green space in neighborhoods throughout their city is introducing students to a real-world equity project. The special education teachers who use digital tools that facilitate reading, writing, and creating are empowering students with the skills they need to succeed. And the economics teacher who enables students to access tools and analyze real-time data to identify trends and make predictions on the stock market is equipping students with marketable skills.

The future of learning hinges on our ability to effectively prepare new teachers to design and implement technology-enhanced learning activities that foster student agency and improve student engagement, motivation and learning outcomes.

We hope these findings aid education stakeholders in identifying strategies to accelerate systemic change.

Digital Equity and Transformation Pledge

WE'RE COMMITTED TO DIGITAL EQUITY AND TRANSFORMATION

1) **Prepare teachers to thrive in digital learning environments.** We will prepare future teachers to use technology to provide equitable learning opportunities that support student success in all classrooms. This includes experience teaching in online or hybrid settings.
2) **Prepare teachers to use technology to pursue ongoing professional learning.** We will prepare future teachers to use technology for collaborative learning and professional growth. This includes participating in online communities of practice relevant to their teaching goals and aspirations.
3) **Prepare teachers to apply frameworks to accelerate transformative digital learning.** We will prepare future teachers to create effective digital learning experiences using nationally recognized educational technology standards. This includes aligning coursework and clinical experiences to those frameworks.
4) **Equip all faculty to continuously improve expertise in technology for learning.** We will support all EPP faculty in modeling effective use of technology for instruction to build confidence and competence in future educators. This includes building capacity through faculty professional learning.
5) **Collaborate with school leaders to identify shared digital teaching competencies.** We will partner with schools to establish a shared understanding of the teacher competencies required for effective, equitable use of technology for learning. This includes modeling exemplary approaches to technology use that are relevant to the vision, culture and infrastructure of partner schools.

FINDINGS

1. Too Few Faculty Model Digital Pedagogy Skills

Modeling instruction is a powerful way to demonstrate digital pedagogy skills. It scaffolds understanding and practice, while actively engaging preservice teachers before their student teaching experience.

Slightly more than half (53.5%) of EPPs indicated that many of their faculty use technology, only 9% of EPPs reported that *every* faculty member embraces and models instructional technology, identifying this as a significant area for growth.

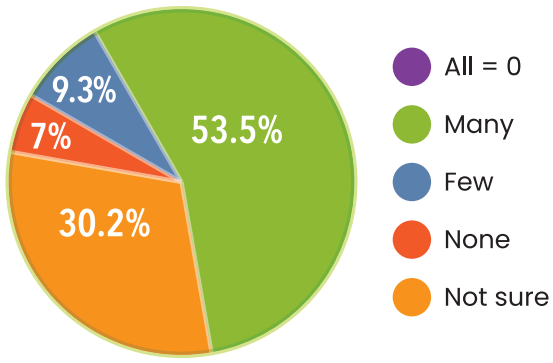
Recognizing this as a priority, several EPP respondents outlined specific goals and actions to improve the use of learning technologies in courses. As one respondent put it, "We need to stay current and even ahead of the curve, so PD is very important for our department." Others had faculty become ISTE Certified Educators to increase their skills in personalized learning. Another indicated the need to "use technology seamlessly in all courses … with forethought and innovation that prepares preservice teachers to be flexible and effective."

The findings from the survey of new teachers suggest that preservice teachers would welcome such a change. Their comments ranged from a desire for "more group work where we used tech together," "more formal information and modeling," and recommendations for faculty to "show multiple ways to integrate [learning technologies] into lessons."

As one EPP respondent succinctly expressed, "All faculty and preservice educators should be digitally competent. They should be able to use technology to solve problems, communicate, manage information, collaborate and create, and share content effectively, appropriately and securely."

As EPPs address this capacity gap, more faculty can bring innovation to curriculum, provide hands-on expertise in labs, and model practice in methods

Percentage of EPPs: Gauging Faculty Integration of Instructional Technology



Inspiring Faculty Buy-In at UCA

The University of Central Arkansas (UCA) has built an impressive program with effective partnerships, including recognition as an Apple Distinguished School where every student has access to a device. A few faculty are also ISTE Certified, ensuring preservice teachers have fundamental skills like media literacy to validate source materials and digital fluency to evaluate educational apps. Jason Trumble, Ph.D., associate professor of education, has his students "think critically about the technology they are using" when designing learning to meet learning standards. All candidates are also assessed on their effective use of instructional technology during internships, a practice built throughout their program.

When UCA began modernizing its program, faculty champions led the effort, however, some faculty were skeptical. Associate Dean Michael Mills understood that "people move at the speed of trust. They have to feel that their peers are succeeding" before convincing others to join in this effort. So they invited faculty to join a technology committee.

In one instance, preservice teachers inspired a faculty member to begin exploring new tools. In other classes, preservice teachers had rich, hands-on learning and wanted that to be the case in all courses. Because of this faculty's commitment to lifelong learning, they grew their skills and were recognized for their excellence several months later by an edtech company.

Requests from students and collaboration with peers were the catalysts to build buy-in from faculty. "Not everyone starts at the same place or is on the same path, but with collaboration and kindness, we can get everyone on board and move the pin forward," Trumble said. You can learn more about UCA's programs here.

classes, certificate programs and beyond. The reward for such changes is a program that not only meets the needs of new graduates but one that is also recognized for its innovation and leadership.

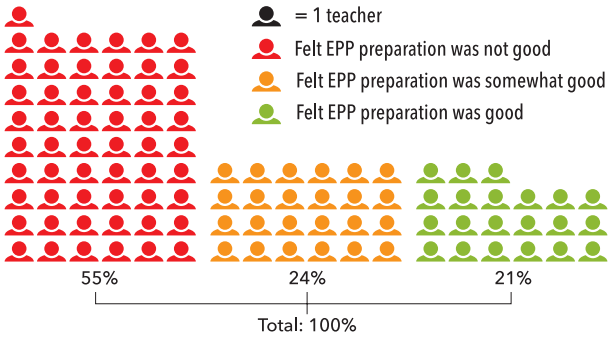
2. Half of New Teachers Lack Confidence With Learning Technologies

A staggering 56% of new teachers currently lack confidence using learning technologies effectively. The cultivation of student agency and other essential learner attributes require that students have access throughout their academic career to teachers who can facilitate technology-rich learning experiences.

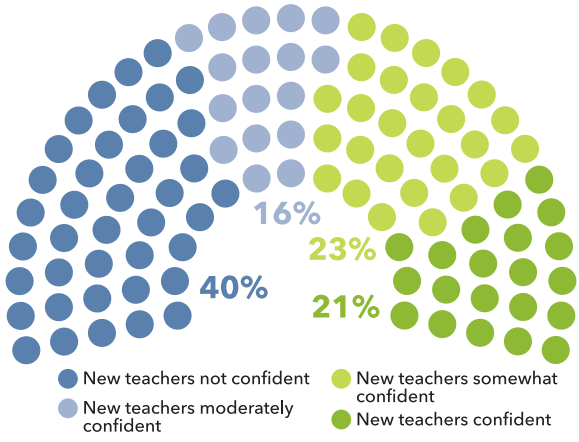
Inconsistent or uneven access to teachers who are skilled in digital pedagogy perpetuates inequities across schools and districts. Without it, many students lack the benefit of learning experiences that foster collaboration, problem-solving, creativity and computational thinking. While there is an urgency to graduate many more new teachers to address staffing shortages, it is equally imperative that graduating cohorts are well prepared with skills so every student has access to teachers who can implement high-impact learning with technology.

The figures below vividly illustrate the wide gap in perceptions between how well they were prepared and how confident they felt using technology when entering the classroom.

New Teachers Reflect on Technology for Learning



New Teacher Confidence with Instructional Technology when Entering the Classroom



Developing Teacher Competencies Through Hands-On Experiences at UVU

Utah Valley University (UVU) began its journey to build an innovative program that modeled learning with technology in 2016. Today, all students gain valuable experience and build practice throughout their program.

Students begin with the required Equitable Technology Integration course, where they build a foundation using educational technologies. UVU is equipped with a mobile STEM lab and creative learning studio, and has ISTE Certified faculty ensuring that digital pedagogy and hands-on learning are infused throughout the preservice teacher experience.

This rich, consistent experience was further strengthened for some candidates who joined Krista Ruggles, Ph.D., associate professor of elementary education, on visits to the San Juan School District in the Navajo Nation. Ruggles and her candidates taught robotics lessons to elementary students. Utah is one of many states prioritizing K-12 computer science and computational thinking. The preservice teachers observed how faculty modeled instruction and had opportunities to lead activities with the students themselves, delivering activities designed with learning outcomes in mind.

UVU also brings K-12 students to an on-campus makerspace that's equipped with robots. Preservice teachers work with these students, "which is important because preservice teachers don't usually see that level of integration when they're out in their field experiences," Ruggles said. "Algorithms and debugging hands-on is powerful."

Dean Vessela Ilieva describes UVU as "faculty using [technology] intentionally and purposefully … and committed to ensuring candidates are ready when they enter the classroom." UVU signed the Digital Equity and Transformation Pledge to advance its educator preparation program. "Our plan focuses on developing these teaching competencies so candidates become leaders in instructional technology and deepening our partner collaborations" to ensure more equitable access to technology-integrated learning experiences.

You can read more about Utah Valley University's program and its use of the creative learning lab here and more about its whole program here.

When it comes to giving preservice teachers opportunities to learn how to use technology for instruction, EPPs vary in depth and breadth. Unfortunately, most new teachers reported that classroom technology in their programs was outdated or primarily focused on teacher-centered instruction. To address this issue several recommendations were put forth for EPPs to include more hands-on practice with common apps and tools, or the establishment of a "lending library" to increase exposure to a wider variety of tools that teachers might see in their future schools.

Among the 21% of teachers who reported feeling confident, their needs differed. These new teachers felt confident in their skills and well prepared, yet they still wanted more classroom management experience in a technology-rich environment and support in selecting tools that best facilitate student learning.

The survey of new teachers indicated that a majority of them wanted more experience with learning technologies. EPPs that prioritize access to and practical experience with technology are more likely to graduate new teachers who possess the confidence in their skills and the ability to transfer these skills to new situations. In turn, these new teachers will help narrow the opportunity gap for their students.

3. Quality Coursework Requires Deep, Broad Practice in Digital Pedagogy

Curriculum is at the core of teaching and learning because it reflects what is valued. Because of its central role, curriculum needs to be updated as our body of knowledge evolves. In the last decade, accelerating technological change has fundamentally altered how and what we teach and learn.

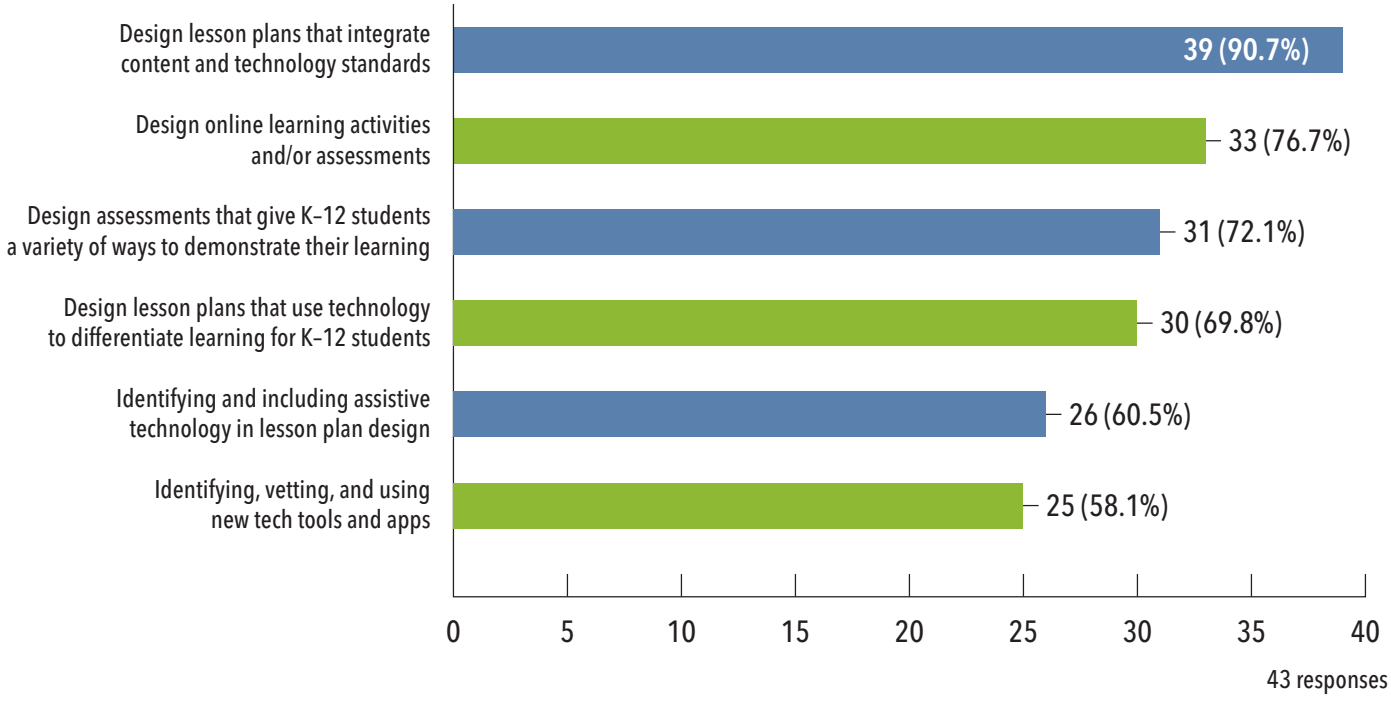
Currently, 65% of EPPs surveyed are in the process of updating their curriculum, presenting a valuable opportunity to modernize coursework to align with the future of education. Instructional technology frameworks can help make curriculum more contemporary and focused on designing and facilitating rich, authentic learning experiences. Candidates who have ample opportunities to practice effective strategies using learning technologies are the ones who can identify the right place and the right way to boost intended learning outcomes.

Among the EPPs surveyed, the following design skills were the most commonly included in assignments:

While most programs surveyed acknowledged the use of frameworks to develop candidate digital pedagogy skills, data from the teacher survey indicates that significant gaps exist in reaching the desired impact on teacher candidates. A comment from one new teacher captures this sentiment: "I taught myself how to use [learning technology] because no one taught me, and I wanted to be the best I could be for my students."

Regardless of which framework is used, the breadth, depth and quality of implementation throughout the curriculum is vital for ensuring candidates gain the practice they need to be confident in the classroom. When done well, EPPs can achieve two consequential outcomes: first, teachers graduate feeling prepared for the connected classroom; and second, they can make strides to close the equity gap so that every student throughout their academic career has teachers who empower them to be lifelong learners in a rapidly changing world.

Common Integration Strategies in Curriculum Assignments



Frameworks Provide North Star at TWU, Ensuring Candidates Are Classroom Ready

Texas Woman's University (TWU) is ranked among the most ethnically diverse undergraduate institutions in the U.S., with 27% Hispanic/Latinx, 18% Black and 10% Asian students. In 2022, 875 students enrolled in the College of Professional Education. The college attracts and recruits faculty committed to ensuring a robust, high-quality curriculum that meets the needs of future educators. Coursework aligns with state and national standards, creating a cohesive throughline that scaffolds knowledge and skills. Associate Dean Gina Anderson said, "[Faculty and candidates] can see exactly how technology fits in everywhere through everything they're doing."

Amanda Hurlbut, Ed.D., created the Technology Integration for Diverse Learners course, which illustrates the program's alignment to state and national standards.

Course SLOS Aligned with National and State Standards

Instructional Unit/SLO	INTASC Standards	PPR Standards	T-TESS Standards	ISTE Standards	Course Activities and Assessment
Instructional Strategies/ Instructional Planning	**Standard 7–Planning for Instruction:** The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context. **Standard 8–Instructional Strategies:** The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.	**Domain I, Competency 003:** The teacher understands learning processes for designing effective and coherent instruction and assessment based on appropriate learning goals and objectives. **Domain I, Competency 004:** The teacher understands learning processes and factors that impact student learning and demonstrates this knowledge by planning effective, engaging instruction and appropriate assessments. **Domain III, Competency 008:** The teacher provides appropriate instruction that actively engages students in the learning process.	**1.1 Planning Dimension–Standards and Alignment:** The teacher designs clear, well-organized sequential lessons that reflect best practice, align with standards and are appropriate for diverse learners. **1.4 Planning Dimension–Activities:** The teacher plans engaging, flexible lessons that encourage higher order thinking, persistence, and achievement.	**4–Collaborator:** Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems. **5–Designer:** Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability.	**Flipped Classroom Teaching Demonstration**

Across the faculty, TWU is designing learning experiences where candidates get practical experience. Maria Peterson-Ahmad, Ph.D., associate dean for research, inclusion and innovation, has her students design a unit plan where they choose tools to fit the expected learning outcome. This and other assignments become part of their digital portfolios to share with future employers. Sharla Snyder, Ph.D., interim chair and professor in the Department of Literacy and Learning, has "designed brain-based learning in play in the new early childhood PK-3 programs, including STEM and digital citizenship."

TWU is a leader in approaches that provide preservice teachers with opportunities to simulate the classroom experience before they embark on student teaching. They use virtual immersion software that allows candidates to practice classroom management, student engagement strategies and more. Preservice teachers receive feedback from faculty and reflect on their experiences. This powerful method builds candidate confidence and allows for meaningful feedback and self-reflection, all before entering a physical classroom. Dean Lisa Huffman says the goal is to "ensure [candidates] are ready on Day One for clinical study or their first day in the classroom as a new teacher."

You can learn more about their programs here.

ACCELERATORS OF CHANGE

Over the course of this research and discussion with teachers and EPPs, we have identified four actionable steps that EPPs can take to ensure greater success for new teachers as they enter the classroom.

1. Make the Commitment: Sign the Pledge

Developed in partnership with the U.S. Department of Education, ISTE launched the EPPs For Digital Equity and Transformation Pledge in 2022. This pledge empowers EPPs to prioritize systemic change in how they prepare new teachers. By signing the pledge, EPPs become part of a national network that is taking actionable steps toward achieving the pledge's vision. Sign the pledge here and find coalition member resources here.

2. Lay a Foundation for Ongoing Professional Growth

Continuous improvement has long been part of the fabric of EPPs. Faculty overwhelmingly look to peers for professional learning (88%), and over half (54%) turn to external organizations and agencies for professional learning opportunities. This dedication to their own professional growth keeps their practice current, adapting to changes in the field. Modeling this practice and helping candidates build their professional networks before they graduate will benefit new teachers throughout their careers. EPPs can:

- Formally incorporate virtual professional learning networks or communities of practice into the preservice experience, like AACTE Connect360.and access to valuable webinars, blogs and briefs from AACTE's Committee on Innovation and Technology.
- Facilitate assignments or projects that require active participation in a virtual professional learning network.
- Provide funding to bring preservice teachers to conferences and co-present with them.
- Incorporate research or publish research in SITE's open access journal, Contemporary Issues in Technology and Teacher Education.

3. Leverage the ISTE Standards as a Framework

The ISTE Standards are internationally recognized, research-based and widely adopted in K-12. They define competencies for education professionals and currently 51% of EPPs use them in different capacities. EPPs can use them in more varied ways and with an emphasis on the quality of application:

- To align teacher education standards with accreditation efforts for CAEP or AAQEP.
- To develop curriculum and coursework where candidates apply digital pedagogy skills.
- To support faculty professional development with the Teacher Educator Technology Competencies and digital pedagogy by recognizing the expertise of faculty who earn ISTE Certification.
- To earn ISTE Recognition for aligning to the ISTE Standards, with the potential to provide candidates with a pathway to ISTE Certification.

4. Collaborate to Develop Effective EPP and District Partnerships

EPPs and districts have a mutually supportive relationship. The data indicates that 74% of EPPs meet with district leaders to learn what technologies are most widely used in their districts, and 74% collaborate with districts to promote the teaching profession among high school students. EPPs can enhance these partnerships by considering additional strategies:

- Arranging for faculty beyond clinical supervisors to visit schools, observe classrooms and media labs, and co-teach a lesson. One participant said, "Faculty collaborate with K-12 district partner teachers on grant-funded projects. In this reciprocal model, faculty are aware of the resources available in PK-12 spaces and teachers are aware of the research we are doing."
- Involving K-12 district partners, including classroom teachers, to better inform EPP curriculum design. According to one EPP faculty surveyed, "We meet regularly with K-12 teachers and local district leaders to support the modification and application of our curriculum. At a minimum, we include K-12 teachers in our conversations annually."
- Ensuring that preservice teachers are placed with classroom teachers who have strong digital pedagogy skills and who model meaningful use of instructional technology.
- Exploring jointly created research opportunities related to the impact of instructional technology on student learning.

CONCLUSION

ISTE, in collaboration with a national coalition of higher education organizations, (AACTE, AAQEP, CAEP and SITE), is working with the U.S. Department of Education Office of Educational Technology to support EPP changemakers committed to digital equity and transformation. As we emerge from historic and unparalleled disruption, education stakeholders have a unique opportunity to impact the future of learning for a generation. The task of bringing about systemic change in how we prepare new teachers is undeniably challenging, but it is one that many EPPs are ready and willing to undertake.

Leaders from programs that range from small to large, urban to rural, and serving more diverse candidates than ever before, have signed the pledge and joined the national conversation to learn from and inspire each other. The findings of these landmark surveys have shed light on areas of urgent need and highlight examples of EPPs that are leading the way. ISTE remains dedicated to expanding this research in the future for how comprehensive EPPs are preparing new teachers and showcasing stories of systemic change uncovered along the way.

For more information about how you can participate in our shared work, please visit iste.org/epp-pledge.

Acknowledgments

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A special thanks goes to Jenna Conan Simpson, Ph.D., whose curiosity and drive led her to research new teachers' confidence and preparation for connected classrooms.

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