



# **A Leader in Technology for Education Puts Artificial Intelligence into Practice**

An Advanced Information Architecture Case Study

JANUARY 2023

**PROJECT  
EVIDENT**

## Information Architecture: Equitable AI for Evidence Building & Use

*Information architecture* refers to organizing, structuring, and labeling content with the goal of helping users find information and complete tasks. *Artificial Intelligence (AI)*, a subfield/related field, describes systems or machines that mimic human intelligence to perform tasks and can iteratively improve themselves based on the information they collect; examples include natural language processing, chat bots, and recommendation engines.

In the social and education sectors, AI is not easily accessible as a result of gaps in technical knowledge, lack of funder support, and a gap between practitioners' equity commitments and the current lack of anti-bias focus in most AI technology products and services. Consequently, practitioners rarely deploy AI to collect, synthesize, and mobilize data to drive impact, scale, and equity.

***Information Architecture: Equitable AI for Evidence Building & Use, led by Project Evident and funded by the Bill & Melinda Gates Foundation<sup>1</sup>, aims to address barriers to the effective and equitable adoption of AI in the education and social sectors.*** The goals of this work are:

- For artificial intelligence (AI) to become more accessible to organizations in the social and education sectors through knowledge and through funding from philanthropy and governments
- For AI to drive better, more meaningful, and more equitable outcomes for practitioners and communities by embedding anti-bias design in AI planning
- For organizations to feel confident in their ability to seek out, design, and build AI systems

In 2022, a small group of Gates Foundation education grantees participated in a learning cohort focused on advanced information architecture, facilitated by Project Evident. Based on the common needs of the members, the goal of the **Advanced Information Architecture (AIA) cohort** was for each team to design an AI-powered recommendation engine to advance their organization's work. Program, technology, data and evaluation, and strategy leaders took part in group sessions, independent exercises, and expert coaching. Each nonprofit produced a "solution blueprint" laying out the key features of its proposed recommendation engine alongside the necessary preparation and implementation steps.

This case study profiles one of the organizations in this Advanced Information Architecture cohort. To see other cases and learn more about *Information Architecture: Equitable AI for Evidence Building & Use*, please visit <https://projectevident.org/information-architecture/>.

---

<sup>1</sup> This report is based on research funded in part by the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.



# A Leader in Technology for Education Puts Artificial Intelligence into Practice

**JANUARY 2023**

While the nonprofit **Digital Promise** is a leader in the use of technology in education, it approached the possibility of applying artificial intelligence (AI) in its own work with some skepticism, unsure about the data, expertise, and resources that would be needed and concerned about potential bias. By participating in a learning cohort for education nonprofits interested in using advanced information architecture and AI, Digital Promise instead came to view artificial intelligence as an essential element of its strategy for scalable digital equity. Digital Promise is now moving forward with a plan to build an AI-powered recommendation engine that will help connect educators to relevant professional learning opportunities as part of its Verizon Innovative Learning Schools program, and sees potential for other AI applications in the future.

## **A Recommendation Engine to Match Educators with Professional Learning**

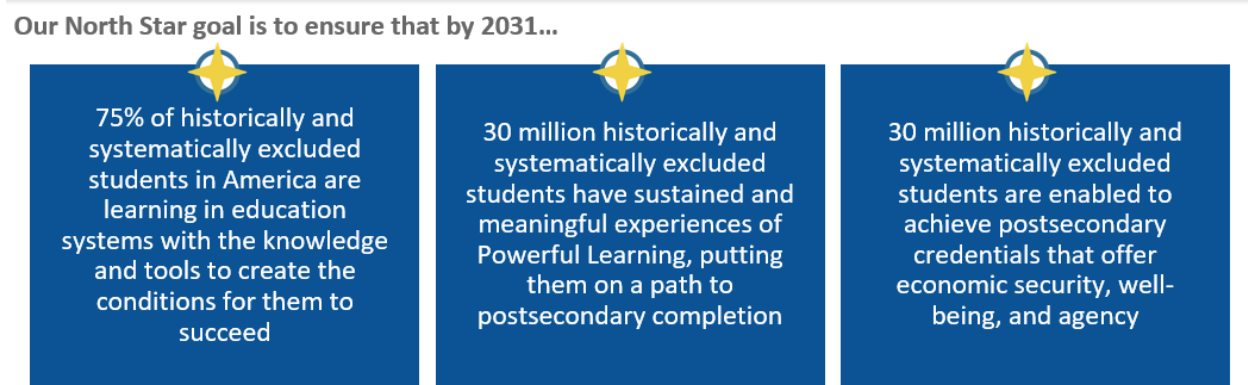
The nonprofit [Digital Promise](#) works at the intersection of education leaders, researchers, and technology developers to improve learning opportunities for historically and systematically excluded learners. When they joined the Advanced Information Architecture (AIA) Cohort, the Digital Promise team quickly agreed on where to apply artificial intelligence in their work: to [Verizon Innovative Learning Schools](#). Through this program, Digital Promise and Verizon collaborate to support middle and high schools across the country by providing every student and teacher with a device and data plan as well as IT support and professional learning for teachers.

Connecting educators to relevant learning opportunities is a key component of the Verizon Innovative Learning Schools model, but making the right connections at scale was a problem Digital Promise hadn't yet solved. They wondered if an artificial intelligence-powered recommendation engine might offer an answer. The Verizon Innovative Learning Schools



program was clearly aligned with Digital Promise’s equity-focused north star goal (Figure 1), making it an intriguing candidate for the organization’s first internal application of AI. Because the program had been operating for several years, it had an established design and plenty of rich longitudinal data with which to develop a recommendation algorithm centered on providing professional learning to teachers. The team could also see a path to collecting other necessary data in the future because Digital Promise’s role includes managing program infrastructure. “This was a project that was big enough, baked enough, and we have enough control to make it work [for a recommendation engine], and it fits in our strategy as an organization and our north star goals,” summarized Chief Strategy Officer Vic Vuchic.

**FIGURE 1: Digital Promise’s North Star Goal**



For an organization already seen as a thought leader around the use of technology in education, designing a recommendation engine for Verizon Innovative Learning Schools was an opportunity for Digital Promise to put its principles to the test. “We’ve done a lot of work on how AI can help educators or how educators can use AI. We hadn’t actually turned that lens on our own work yet, so that was really intriguing,” said Vice President & Chief Operating Officer Kathryn Petrillo-Smith. The team was experienced enough with data and technology projects to identify potential obstacles to an AI solution: cost, access to expertise, demands placed on administrative capacity, the possibility that an overly complex solution might fall apart on the way to implementation. Having raised flags for others in the education sector, they were also alert to the potential for AI systems to reproduce or deepen bias. Still, they wanted to seize this chance to pause and think big, together – something that wasn’t always possible at their fast-moving and fast-growing organization. As President & CEO Jean-Claude Brizard explained, “When you look at the funding structures for nonprofits, it typically does not allow for this kind of work to actually happen... Most nonprofits don’t have the time or the resources to build the infrastructure needed to identify what is not working and to allow things to actually scale.” Director of Information Technology Diane Doersch said that a recommendation engine had seemed out of reach. **“I always dreamed of stuff like this, but as an educational entity you don’t have the money to be able to imagine these types of things and then make it work.** I always imagined the possibilities of a recommendation engine. Amazon was great at capitalizing on

that. Wouldn't it be great to have children actually have an Amazon-like education where they could own their learning?... But I never really thought it could become a reality because as a [nonprofit or] public school district you just didn't have access to funding those big dreams." The opportunity to design Digital Promise's own recommendation engine, Doersch said, "just opens a whole new avenue for imagining."

#### THE DIGITAL PROMISE AIA COHORT TEAM

Titles at time of cohort participation

- **Jean-Claude Brizard**, President & CEO
- **Diane Doersch**, Director of Information Technology, Verizon Innovative Learning Schools
- **Kathryn Petrillo-Smith**, Vice President & Chief Operating Officer
- **Vic Vuchic**, Chief Strategy Officer
- **Stefanie Mills**, Senior Technical Product Director

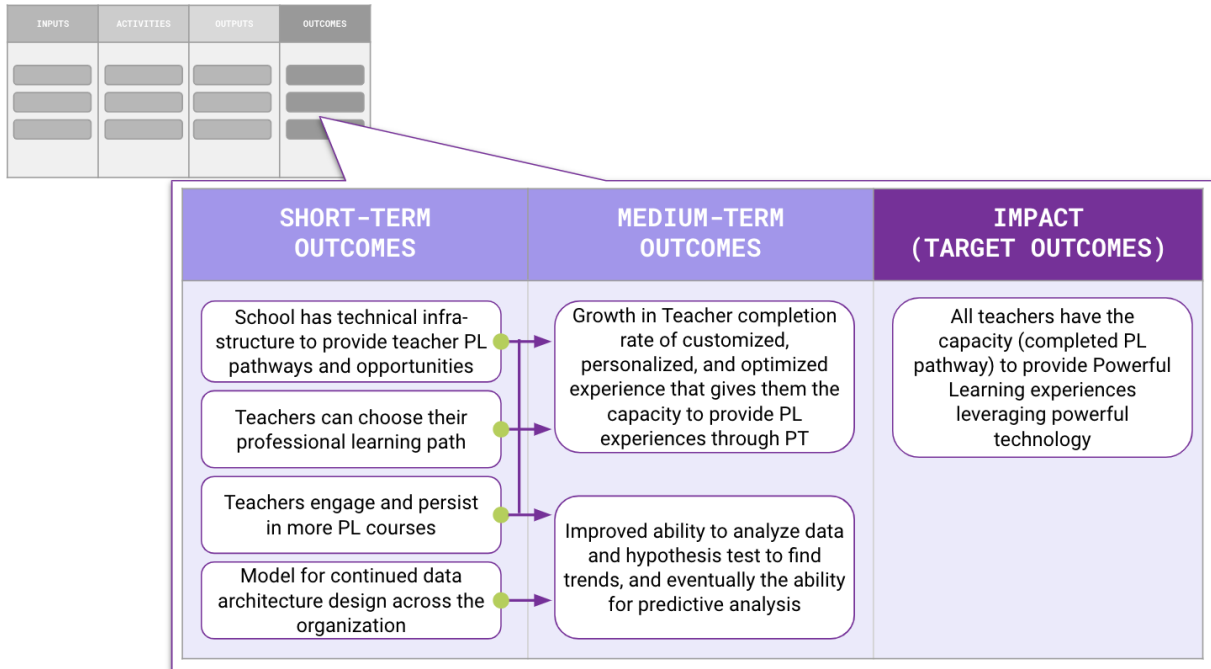
## Understanding How an AI Solution Can Drive Scalable Digital Equity

Following the structure laid out for the AIA cohort, Project Evident facilitators and external subject matter experts guided the Digital Promise team through a sequence of learning and exercises to develop a recommendation engine that was programmatically aligned, technically feasible, and constructed to guard against bias.

One of the team's first activities was to agree on the outcome they wanted to enhance through creating a recommendation engine. (In AI terms, this is known as a "target variable outcome" and must be a component of the intervention's logic model.) Digital Promise determined that its target variable outcome would be the completion of Powerful Learning courses by teachers (Figure 2).

The group then examined what data they already had and what was missing, focusing on the components of their logic model that were expected to influence the target variable and therefore should be incorporated into the recommendation algorithm. They considered both the internal and external users of the solution, determining that Verizon Innovative Learning Schools coaches would be the primary initial users but that there might be potential to make recommendations directly to educators in the future.

**FIGURE 2: Key Variables/Data in Digital Promise’s Proposed Recommendation Engine**



Doersch said that this exploration drove home the basics of data structure and integrity. Although the Verizon Innovative Learning Schools data were in fairly good shape for this new purpose, that alignment could have been more deliberate had the initial planning been done with AI applications in mind. “Datasets are so important. Having clean datasets at the beginning, being able to isolate them and have them in formats that can be read is key, being able to slice and dice your information. I can’t say that some of the early systems we implemented would allow that. **If we were to give advice to other people, it would be to be aware of the datasets that you have and whether you can partition them out the way you need to. That all comes down to initial architecture.** Probably no one was thinking about those things when we put some of these software packages in place.” Senior Technical Product Director Stefanie Mills emphasized that any AI or recommendation engine project needed to originate in both user research (“what are we really trying to be laser focused on and resolve?”) and a thorough process of data discovery.

One of the team’s most important – and most welcome – insights was that developing a recommendation engine using AI seems likely to be less resource-intensive and difficult than they initially expected. Digital Promise joined the cohort intrigued but concerned about the cost and technical expertise that would be required to build and maintain an AI solution. The use cases shared with the cohort and advisor Peter York of BCT Partners alleviated those anxieties by suggesting ways the Digital Promise team might simplify their plan and pointing out where more widespread adoption of AI (including in the for-profit sector) and advances in the state of the art had reduced costs. Digital Promise will still need substantial financial and human

resources to implement its plan, but it concluded its cohort work more confident that the level of investment was feasible and worthwhile given the potential of the tool. As Vuchic said, “Where we learned a lot was in terms of what are the steps that it would take, what’s the level of effort, and ultimately actually [that] the cost is probably lower than what my mental model was going in.”

Crucially, the Digital Promise team also came to view artificial intelligence as vital to its digital equity strategy. Although the team began the project with some skepticism about the “black box” nature of algorithmic solutions, they ultimately came to view AI as an essential tool for achieving their equity goals. As Vuchic explained, equity is at the core of Digital Promise’s north star goals and of the Verizon Innovative Learning Schools program, so it was naturally at the center when the team began to think about a recommendation engine. What changed was the way that Digital Promise balances the risks and the benefits of AI with respect to equity:

*We’re often raising flags and trying to raise awareness of the bias of AI and machine learning and the pitfalls... The thing that hit me in the [Verizon Innovative Learning Schools] context is that we have [more than] 500 schools, thousands of teachers, and we’re trying to help them build their capacity to serve diverse learners, especially those who are underserved. There’s equality, which is [students] all get the same thing everywhere, and then it doesn’t work for a lot of them. **Equity is when we get them whatever they need through personalized pathways. The challenge is it gets complex really fast, and you can’t handle that level of complexity without the support of machine learning and AI...** [AI] does have risk when it’s at scale and when it’s hard to understand but, on the flip side, we wouldn’t be able to even step into providing that level of personalization without these tools.*

Mills agreed. “When I think about this project, I believe it leads to scalable digital equity. We are already deep into many facets of equity work as an organization, but a recommendation engine for learners provides a way for the *learner* to determine *their* path while leveraging an unseen technology that helps them be successful on their learning journey with Digital Promise. **Scaling personalized learning experiences that help to build powerful learning experiences – that is digital equity.**”

## Next Steps

For Digital Promise, the structured process laid out for the AIA cohort was valuable, breaking a potentially sprawling project into manageable pieces and helping the team hold time and space despite competing priorities. Access to expert advisors and examples of how other education and social sector organizations have applied AI with an equity lens also helped the team form its own concrete and attainable vision. “I did appreciate seeing how a concept became an actionable reality,” said Doersch. “Hearing some of the use cases and how this work was used to provide just-in-time services for different organizations was really helpful in envisioning what



we could do.” As Petrillo explained, “Having somebody else give us that framework, scaffold the process for us and give us the use cases — [designing an AI solution] wouldn’t have happened without that. There’s a discipline in that that is sometimes hard to impose upon yourself.”

Design blueprint in hand, the next steps for Digital Promise are to solidify the funding needed to build their solution and engage more members of their team as they move toward implementation. “There’s definitely a commitment to continuing the effort and seeing what we need to raise externally and what we can contribute internally to make this happen,” said Brizard. Once the recommendation engine is in place, Digital Promise can begin to understand its impact on Verizon Innovative Learning Schools coaches, educators and, ultimately, students. Even at this early stage, however, the organization’s leadership is clear that using technology to organize and apply knowledge is non-negotiable. According to Brizard, “We had a staff session on knowledge management and I was surprised by the level of interest from the entire staff. **We are a knowledge producing organization and, if we don’t find ways of doing this kind of work, then ultimately we become obsolete and irrelevant. For me, this is the tip of the spear of what needs to happen across all of our divisions and all of our projects down the road.** This has been an amazing learning experience for this group of folks that we would love to inform the rest of the organization.”

In addition to exploring other AI applications within Digital Promise, the organization sees potential for its solution design to benefit the field, where getting the right professional development to the right educator at the right time is a common challenge. Petrillo says that Digital Promise’s recommendation engine design is “not going to be some proprietary engine that you have to pay millions of dollars or hundreds of thousands of dollars to access. We do want this to be for the public good. If we as a nonprofit, or other nonprofits, are going to invest in something like this, it’s not an insignificant investment. In terms of criteria, [we have to consider] that what we’re making will not just benefit our own work but benefit the broader field.”

## For More Information

For more information about Digital Promise’s Equitable AI project, please [contact Vic; Vuchic](#), Chief Strategy Officer.

For more information about *Information Architecture: Equitable AI for Evidence Building & Use*, please [visit the initiative’s website](#) or [contact Sarah Di Troia](#), Senior Strategic Advisor, Product Innovation at Project Evident.

