Blueprint for Inclusive Research and Development in Education (BIRD-E)

Comprehensive Report: Steering Committee

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BIRD-E

A project by InnovateEDU InnovateEDU

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BIRD-E

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Background

Every child deserves an equitable, high-quality education experience, but this can only be achieved if we know what actually makes a difference for students and the educators who work with them. Research and evidence are most valuable when people use them to make effective decisions for students who need the most support. Unfortunately, the current structure of education research - from who does the research, how the research is conducted, and how it is disseminated - makes it difficult to tie research to action.

The state of our nation's education research and development system is fragmented, fractured, and siloed. The current system of research does not consistently put the needs of students and communities at the center and lacks applied evidence that can solve the problems of practice and policy. The federal investment in education R&D pales in comparison to other sectors such as healthcare and defense. Federal education research spending accounts for 0.4% of education spending, compared to 3% nationwide, 6.3% in health, 12.3% in defense, and 46.1% in energy. The tensions between equity, innovation, and quality education research only become exacerbated without proper resources devoted to the breadth and depth of research topics that truly elevate teaching and learning.

The generation and flow of knowledge in education is dominated by producer-push models. The underlying logic of the producer-push approach is that high-quality research is produced by researchers and made clear and accessible, and then practitioners apply it to their work. This model has resulted in a system where the research being conducted is disconnected from the needs of the educators and decision-makers. Efforts to enable discoverability and mobilize evidence on the effectiveness of programs, practices, and interventions are limited. According to a Gallup Survey, educators trust a variety of sources for making decisions but fellow teachers are by far the most trusted source. Most decisions about curriculum are based on peer advice. Sharing knowledge is invaluable among peers if the network is more informed through improved mobilization of research.

Despite more than $41 billion spent on EdTech before the pandemic and much more after that, education research and development lacks a systematic and structured process that addresses what works for whom and under what conditions, with an approach that is rapid, aligned, and cost-efficient.

Current education research lacks a common, shared, research-based data language or vocabulary that would make the ability to understand and disseminate research more consistent, structured, and universal. Currently, the evidence that is generated is expensive, bespoke, and does not often support the most marginalized students. A more robust R&D system and infrastructure needs to be the answer, with a data backbone that creates a common language. When strong evidence is transformed into practice at scale, it will support innovation, improvement, and more targeted interventions for students who need it the most.

Additionally, education currently lacks an effective comprehensive data infrastructure for consistently defining, storing, transporting, analyzing, and reporting information about how and whether solutions are effective. This is particularly true for solutions in the earlier stages of R&D and with types of data not already typically captured on academic summative assessments. It is also particularly difficult to understand how solution effectiveness varies depending on the context of implementation. Effective data infrastructure is needed to support the Big Bets investments in education research and validate R&D phases. It also would be useful to the field more broadly. The data made available by student information systems, assessments, and instructional tools offer a promising resource for accelerating education R&D. However, researchers today face significant barriers to accessing these data and practitioners lack the ability to effectively understand and implement the research findings that emerge from that data.

With support from the Bill & Melinda Gates Foundation, InnovateEDU is stewarding the creation of a shared infrastructure through regional data capacity and infrastructure investments, with a focus on data privacy and security. Given the long-standing challenges of data in education, it was important to create a collaborative ecosystem of stakeholders who are deeply engaged in determining what types of data will be most useful. The design process should attempt to create consistency through open standards and open-source approaches to be extremely attentive to the challenges faced by historically underserved and poorly served communities -- Black, Latinx, and low-income and disabled students, as well as their teachers. It was also important that this process focus on the inherent tensions of creating common approaches in a decentralized education world and thus careful examination of scalability, adoption, and ecosystem considerations was needed from the very beginning.

InnovateEDU, in collaboration with designated stakeholders, was entrusted to develop and test an open-source data framework that researchers and practitioners can use to understand, interpret, synthesize, and organize data. This will be a critical piece of the broader infrastructure, but will only ultimately be successful if the framework is actually implemented. This project took an intentionally thorough approach, requiring a diverse group of stakeholders to participate in the design.

Following a series of design workshops, InnovateEDU created an ecosystem of collaborators and stakeholders to create an R&D infrastructure that will be:

- **Pilotable:** There is a way to test the prototype infrastructure in the real-world ecosystem.
- **Impactful:** The prototype and the pilot should produce preliminary evidence of potential impact within the first few years of implementation. Evidence might include demonstrating reduced costs to run validation studies, more efficient testing, increased school engagement with research, enhanced shareability of results of studies, improving the quality of user engagement in the R&D process, etc.

- **Advances Diversity, Equity, and Inclusion:** The infrastructure must operate within target communities. Furthermore, the leadership of the infrastructure and those participating within the design process should be representative of the target populations.

A Steering Committee composed of a wide group of diverse stakeholders representing industry, practitioners, researchers, and existing standards organizations was formed between September and December 2019 to officially initiate the design, development, and implementation of the proposed R&D infrastructure. Under the leadership of InnovateEDU, the group's aim is to identify the gaps in the R&D infrastructure and the core challenges inherent to the process, and understand the types of data that need to be collected to inform the development of the framework. The group would lead the development of a data framework for education R&D and serve as a guide for the prototype implementation of that framework.

The proposed prototype's objectives are to:

- Articulate an open-source, data needs framework that emerges from an inclusive, multi-stakeholder engagement approach and from data-driven methods for evaluation.
- Test the framework's ability to generalize beyond a specific research project through a rapid cycle evaluation in the Bill & Melinda Gates Foundation's (BMGF) R&D portfolio with four or more field pilots.
- Create natural linkages to this work among other collaborations currently examining the intersection of data in education such as T3 from the U.S. Chamber of Commerce, ADL, EdMatrix, IEEE, and other efforts underway to organize data and build interoperability in the K-12 education data space.
- Engage other projects within the BMGF education portfolio, especially the efforts with Mathematica and Northwestern, to enhance engagement and collaboration between projects that handle meta tagging infrastructure within K-12 education. In particular, we seek to leverage the work with the Education Endowment Fund to create international cohesion for this work.

The anticipated long-term success outcomes are two-pronged:

1. **Efficiency and effectiveness:** Reduced cost to run research studies, increased school engagement with research, enhanced shareability of studies results, and improved user engagement in R&D process.

2. **Replicability and scalability:** Sector-wide replicability and scalability of frameworks for different types of research for practitioners and other stakeholders.

This work was organized by InnovateEDU, which chaired the Steering Committee and Working Groups into a convening and workshop sequence to conduct a gap analysis of existing methodologies, identify needs and gaps within the researcher and practitioner communities, and build a data framework that could be tested in four pilots within the BMGF R&D portfolio.

Selection and constitution: Steering Committee

Through a clear and deliberate due diligence process, members of the community were identified to represent a diverse group of stakeholders from research, practice, industry, and existing data standard efforts. The Steering Committee served as a participatory and advisory committee to create, influence, and counsel the direction of the BIRD-E project. The Steering Committee originally comprised 23 members. Members were invited in September 2019 and will retain their status until July of 2022. The members and organizations (and noteworthy status updates) are listed below, in alphabetical order.

- ★ Adrienne Murphy, Massachusetts Department of Early Education and Care
- ★ Alex Resch, Mathematica
- ★ Alka Pateriya, Council of the Great City Schools (joined August 2021)
- ★ Bart Epstein, EdTech Evidence Exchange
- ★ Bi Vuong, Project Evident
- ★ Bill Hughes, Education Design Lab
- ★ Bryan Richardson, Bill & Melinda Gates Foundation
- ★ David Nitkin, Transcend Education
- ★ Elizabeth Tipton, Northwestern University (active until December 2020)
- ★ Erin Mote, InnovateEDU
- ★ Jeff Livingston, EdSolutions
- ★ Jessica Heppen, American Institutes for Research
- ★ Joseph South, ISTE
- ★ Karl Rectanus, LearnPlatform
- ★ Katrina Stevens, The Tech Interactive
- ★ Lewis Leiboh, Bill & Melinda Gates Foundation (transition)
- ★ Matthew Soldner, Institute of Education Sciences
- ★ Melina Uncapher, AERDF
- ★ Paul Tearnen, Alvarez & Marsal
- ★ Sean Talamas, Character Lab
- ★ Taryn Mackenzie Williams, Center for American Progress (nominated for federal position)
- ★ Tim Hardy, LEAP Innovations (active until June 2021)
- ★ Valerie Barton, Youth Mental Health Project
- ★ Vivian Wong, University of Virginia

Members were invited based on their areas of expertise and their status as industry professionals. There were several drivers and reasons for members to join this large-scale stakeholder engagement process and spearhead the work with InnovateEDU. Many of the members are already focused on the role of research and evidence in improving the outcomes for students, especially marginalized populations across the country. By being a part of the steering committee, the members agreed to be part of an initiative where they had the ability to support and co-create a movement that has a greater impact on student outcomes.

Norms and expectations of the Steering Committee were established with a clear expectation for this engagement: to create a unified system that allows understanding of what can happen in all schools, that allows translation of complex information to facilitate teachers and researchers to make improvements beyond what is possible - to truly know what works, where, for whom and under what circumstances in education.

Purpose: Steering Committee

The Steering Committee members had a general consensus on the purpose of this multi-stakeholder engagement process to design the framework needed to reimagine the R&D process in education. Some of the main consensus points included:

- There needs to be improvements in the education sector but why, what and how to measure what is broken is missing. This was further exacerbated by a global pandemic which revealed that the sector is far from achieving what is needed for education in the U.S., especially the research and development process.
- The education sector measures an enormous amount, but there is a lack of structure about how to use what data and to what end.
- There's an urgent need for a framework to create consistency in how things are connected in a distributed and disaggregated education system that creates challenges for scalability and replicability. A new structured process or framework would allow for more avenues of "experimentation" that is standardized and allows for teachers, students and parents to be partners in the R&D process.
- Usability drives equity and self-governance. The vision of bringing together a multitude of stakeholders was to prime the market and accelerate equity and inclusion with a sense of urgency.

The Steering Committee was charged with the following responsibilities and engagement:

1. **Gap analysis:** Identify the gaps and challenges of the education R&D ecosystem.
2. **Models of success:** Identify models of success from other industries to inform the design.

3. **Design and composition:** Be a part of the design and determine the composition and engagement process.
4. **Decisions and approval process:** Establish work-flows and decision processes of the Steering Committee and Working Group members.
5. **Strategic roadmap and methodology:** Establish the strategic roadmap of the project and design the comprehensive methodology of the project.
6. **Pilot the prototype:** Select and identify the pilot sites with clear learning objectives, participate in supervision of the pilot and advise on the integration of the learnings in the framework development.
7. **Finalize the framework:** Finalize the draft of the framework, naming, mission and vision documents for external release.
8. **Communication and dissemination strategy:** Finalize the framework and co-design the dissemination strategy for different stakeholders.

InnovateEDU, in collaboration with the Steering Committee, mapped each of these responsibilities and established formal processes and protocols for each of them. The specific details of each of these are explained in the section below.

Key responsibilities and engagements

1. Gap analysis

One of the first engagements of the Steering Committee was to identify the gaps and challenges faced by the education R&D ecosystem. This ecosystem comprises multiple stakeholders including the research community and the practitioners. The Steering Committee, through discussions about the current system - including literature review - identified six core challenges of the R&D ecosystem. These are highlighted below:

a. The inability to understand what works for whom and under what circumstances and a lack of basic building blocks in monitoring and evaluation. Limited research was identified as the biggest impediment in making informed decisions about interventions.
b. The scattered datasets and formats of different data systems from evidence generation to evidence synthesis create siloed data systems inhibiting interoperability.
c. The need for accessible research by educators to make informed decisions. Data suggests high use of EdTech interventions but no evidence of effectiveness and how they impact which students groups.
d. There is a lack of support for educators to make effective decisions through useful knowledge mobilization processes. Educators have a large dependence on peer networks. Due to large

information gaps in the peer networks, teachers are unable to make informed choices about interventions that are effective for their particular student groups.

e. There is a lack of standards to capture and categorize data elements. Different standards bodies work on different aspects of learning taxonomy and lack one universal framework that links the interconnected aspects of each domain of learning standards.

f. Evidence repositories provide information on evidence related to educational interventions, but they all exist in different formats and criteria. Some of the main variances are inclusion criteria, coded features, quality measures, synthesis methods, reporting practices, and categories of evidence. An intervention may not meet inclusion criteria in some categories, or be rated differently in others. There exists a wide range of disagreements between clearinghouses, leading to confusion among decision makers.

Some of the main opportunities that were identified by the Steering Committee included supporting the development of common metadata standards for discoverability across platforms; process and recommendations for making existing federal research discoverable; engaging practice, content and research partners as well as regional research partners to codify and validate school practices; and creating better matching systems to document implementation case studies and outliers.

2. Models of success

In collaboration with the team at InnovateEDU, the Steering Committee identified models of success in education and in other fields to inspire and guide the design and methodology of the framework. The main success models that were identified were:

a. **Clinical Health Care Research and the PICO framework:** The clinical health care research had a need for a paradigm in evidence-based medicine to formulate questions. Without a well-focused question, it was difficult and time consuming to identify appropriate resources and to search for relevant evidence. The absence of a framework for knowledge representation for clinical questions posed in natural language by practicing physicians led to the establishment of the PICO (population, intervention, comparison and outcome) framework. The PICO process (or framework) is a mnemonic used in evidence-based practice (and specifically evidence-based medicine) to frame and answer a clinical or intervention related question. The PICO framework is also used to develop literature search strategies, for instance in systematic reviews or searches. This became one of the primary sources of inspiration for the design and development of the framework.

b. **The Meta Project:** Biomedical science is outpacing research dissemination and there was a need to expand research with context. Absence of a tagging system across available research for further advancement in the field was one of the main impediments in knowledge mobilization. Supported by the Chan Zuckerberg Initiative, the Meta Project puts biomedical research in context to advance research and take it in new directions. It facilitates widespread dissemination of evolving research among researchers and practitioners. It enables researchers to make connections through customized and accessible feeds and real time tagging of resources. It uses machine learning to map biomedical research in real time. The system analyzes and connects scientific outputs to give a comprehensive view of the evolving field. It tags research to create customized feeds through use of schema and associated framework. The impact is that currently 4,000+ papers are added daily, covering more than 39,000 journals and 55,000 pre-prints.

c. **Spotify:** The music industry was suffering from piracy issues costing millions each year. There was a need to create a service better than piracy platforms and still compensate players in the music industry. Spotify focused on existing platforms to improve the quality and do it legally. It has a complex algorithm to analyze, categorize and use machine listening based on digital signatures for a number of factors including tempo, acousticness, energy, danceability, strength of the beat and emotional tone. Early on, the team invested heavily on engineering and modular infrastructure to make user experience technically lightweight and responsive. More than 1,387 music genres have been developed to provide personalized listening experiences to users. The platform is a seamless and user-friendly platform to access music based on user interests and preferences. Apart from saving millions from piracy, 60 million songs have been categorized on a micro-classification level that enhances user experience and choice.

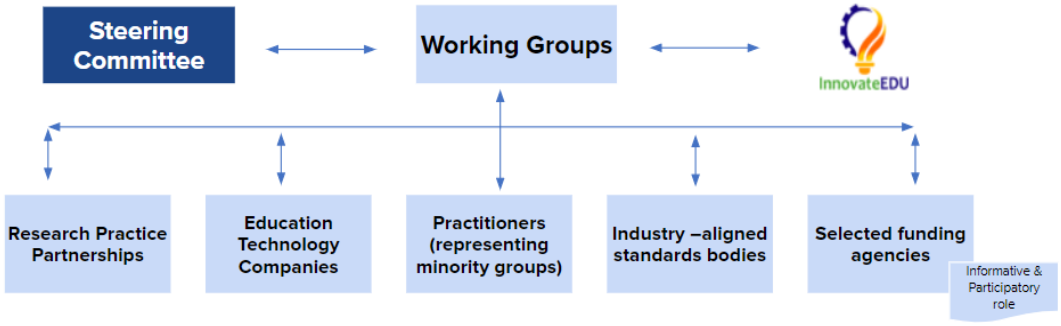
d. **Human Genome Project:** There was a need to identify and map all of the genes of the human genome from both a physical and a functional standpoint to benefit the fields of molecular biology and human evolution. Sequencing and identifying all three billion chemical units in the human genetic instruction set could find the genetic roots of diseases and facilitate developing treatments. The Human Genome Project completed a high-quality sequence of essentially the entire human genome. It identified the locations of many human genes and provided information about their structure and organization. The "genome" of any given individual is unique. Mapping the "human genome" involved sequencing a small number of individuals and then assembling these together to get a complete sequence for each chromosome. The finished human genome is a mosaic, not representing any one individual. The Project made the sequence of the human genome and tools to analyze the data freely available via the Internet. The international consortium comprised geneticists in the United Kingdom, France, Australia, China and myriad other spontaneous relationships. The benefits included impact on the fields of medicine, biotechnology, life sciences and COVID-19 vaccines. Main impacts included genotyping of specific viruses to direct appropriate treatment and identification of mutations linked to

different forms of cancer, design of medication and more accurate prediction of their effects, and commercial development of genomics research related to DNA-based products.

e. **Education Endowment Foundation:** The U.K.-based organization works in the field of evidence generation, synthesis and mobilization. The centralized and very effective system of tying research of interventions with federal funding and making research accessible through a very specific user-driven platform to inform decision making among educators should be studied to find parallels in the U.S. education system and identify components that can be highly relevant and usable.

3. Design and composition

The Steering Committee was in charge of establishing the Working Groups in collaboration with the InnovateEDU team as well as instituting the engagement process and responsibilities of all stakeholders involved in this process. The InnovateEDU team established the nomination process by asking each Steering Committee member for recommendations of 3 to 5 members of the community. A finalized list was compiled and went through another round of review by the Steering Committee. Following detailed and deliberate discussion, the final potential Working Group members list was nominated by the Steering Committee members. The following composition and engagement process for the Working Groups was established under the guidance of the Steering Committee.



	Steering Committee	Working Groups	Chair, Working Groups	InnovateEDU
Main Engagement	Advisory Compilation of final product Consensus building	Assess, define & design	Feedback & guidance Collaboration to build consensus	Coordination & logistical support Collaboration Compilation
Composition & Size	15-18 members	6-8 members	1/ working group	2
Meetings	2 onsite meetings/ year	4 meetings / year (2 onsite/ 2 virtual)	4 meetings / year (2 onsite/ 2 virtual)	Dedicated Project Director Project Advisor (Erin
Deliverables (Time)	40 hours / year	50 hours/ year	20 hours/ year (in addition to steering committee)	Full time 1/week
Compensation	$3000/ year	TBD		
Support	Substantive & logistics support by InnovateEDU			

Figure 1. Composition and engagement process of the Steering Committee and Working Groups

To further crystalize the engagement across all stakeholders, the following responsibilities were established and agreed upon:

a. InnovateEDU will:

- Design a multi-year plan for the project and monitor progress with the Steering Committee
- Coordinate with the Working Groups in designing the framework
- Coordinate alpha and beta pilots and codify learnings
- Report to internal and external stakeholders on overall success of the initiative

b. The Steering Committee will:

- Provide high-level perspective and advice to the Working Groups and the internal team
- Review documents and provide feedback at different points throughout the project
- Provide buy-in on the final framework
- Select and finalize the Working Groups members; review and provide feedback on deliverables
- Achieve cross-sector consensus for the framework

c. The Working Group will:

- Work with the InnovateEDU team to design the deliverable timeline and consensus process
- Conduct gap analysis and design missing elements
- Supervise aspects of the designed methodology as entrusted by the Steering Committee
- Obtain feedback from the Steering Committee on the compilations
- Revise deliverables and build consensus among stakeholders
- Active participatory role in review alpha and beta pilots to provide inputs

4. Decision and approval process

The following broad timeline was set to achieve the goals of the project:

Figure 2. Timeline of project goals

To achieve this timeline, two level approaches were established. Level 1 included the intra-working groups workflows and decision process. Level 2 included the inter-working group workflows and

functional collaboration processes. The decision and approval process of the two levels of functional engagements were designed as follows:

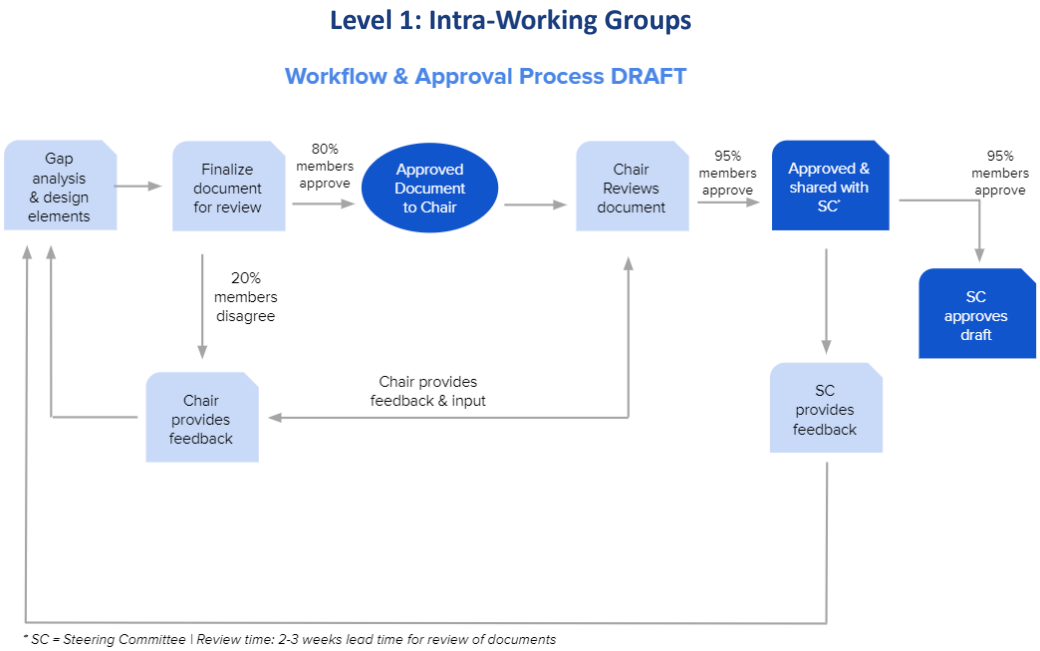


Figure 3. Intra-Working Groups workflow

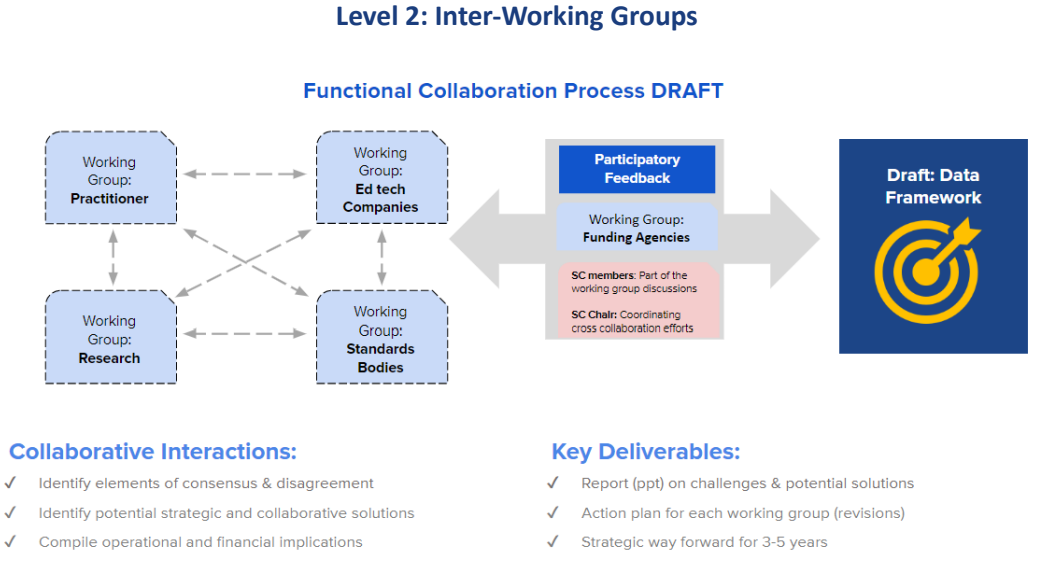


Figure 4. Inter-Working Groups workflow

The Steering Committee collaboration process and protocol was established and consensus was formed across all members. The phased approach of the engagement process was established as follows:

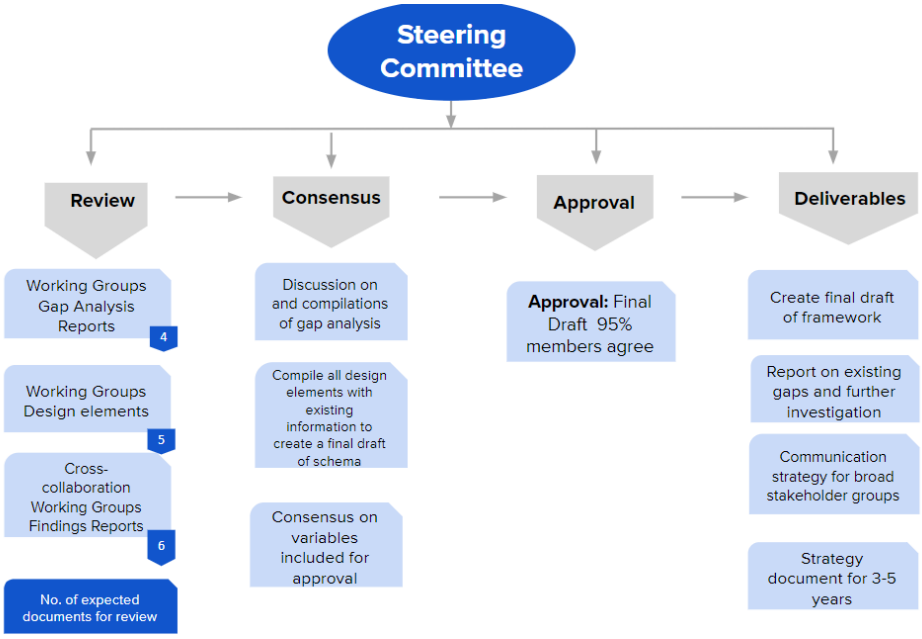


Figure 5. Steering Committee engagement process

Appendix A provides information on the participation rate of all Steering Committee and the Working Groups convenings by members.

COVID-19 Impact

Due to COVID-19, major shifts were made to ensure timely completion of the framework development while still maintaining the feedback process and stakeholder engagement as the key drivers of the design process. Some of the main changes that were made were as follows:

- All meetings were converted into virtual meetings to ensure attendance and participation of the members across the Steering Committee and Working Groups.
- Quarterly meetings were converted into monthly meetings of 60 to 90 minutes each to ensure regular, frequent and bite-size engagement and communication with all members.
- Intermediate steps and collaboration points were detailed out. Both synchronous and asynchronous processes of providing input were created.
- Members were asked for recommendations on different participatory ways to engage,

given the huge demands and shifts in the personal and professional lives of the members, and due course corrections were made to ensure participation.

Overall, 90-minute meetings for each stakeholder group were established with a total of five hours of engagement each month. During the virtual convenings, critical paths or decisions that would be needed to stay on track and necessary modifications were made. Given such an unprecedented situation, there was very limited turnover or transition from the Steering Committee and Working Group members.

5. Strategic roadmap and methodology

To initiate the development process, the InnovateEDU team in collaboration with the Steering Committee and Working Group members designed a strategic roadmap of the project and associated success criteria. The roadmap and the methodology was established through careful deliberation and iterative feedback loops. Specific timelines for each stage were scheduled with broad consensus from the members of the Steering Committee and the Working Group members.

The strategic road map of the project is showcased below:

Stakeholder Engagement	Define Methodology & Collaboration	Data Processing & Gap Analysis	Pilot Selection & Implementation	Build Data Infrastructure	Open Source Schema Adoption
Identify & finalize Steering Committee & Working Groups	Methodology developed	Data processing to compile outputs	Design selection criteria	Design and develop an architecture to support schema including a technical SQL database structure	Open for Public Use
Formalize participation & hold SC convenings	Collaboration for implementation established	Identify concepts, compile & classify	Identification & On-board	Minimum viable product use for R&D in different context	Stakeholder engagement plan for wide adoption
Collaborate on project design	Design use cases and personas	Consensus on data model & concept classification	Set objectives and clear measurable outcomes	Identify critical use cases for alpha & beta pilot to assess replicability & scalability	Provide conceptual & technical assistance to the sector
Establish cadence of communication	Exploration of models for viability being conducted	Gap analysis & define missing elements	Implement alpha & beta pilot to understand and improve success criteria		
		Finalize draft schema			

Figure 6. Project roadmap

The use cases and persona development were critical in understanding the gaps in the R&D ecosystem to design the methodology of the framework. Use cases and persona profiles were developed as the first step towards understanding challenges faced by stakeholders and the

underlying assumptions. The Practitioner Working Group was entrusted to understand the proposed design of the framework and focus on the development of use cases and personas to be reviewed by the Steering Committee. Detailed analysis and explanation of the use cases can be found in the comprehensive report by the Practitioner Working Group.

Sector Mapping

To understand the education research landscape better, a functional "sector map" was developed to map critical stakeholders involved in the education research and development ecosystem. This process was undertaken to inform the critical gaps that existed and what initiatives by different organizations were filling those gaps. This would avoid duplication of efforts, as well as understand complimentary integrations across these initiatives. It was also important to understand the resource allocation to education R&D as a whole.

The main intent of this process was to intentionally think about the research brokering organizations. These were divided into governmental organizations, not-for-profit, for-profit and membership driven organizations. The governmental organizations were further broken down into research agencies at federal, state and local levels as well as standards and evaluation agencies. The not-for-profit organizations were divided into university research practice partnerships, advocacy organizations, issue-based organizations and think tanks. For-profit organizations included research consulting organizations, instructional program vendors and others categorized under solution providers. The membership organizations were professional and network driven organizations[1].

An exhaustive analysis was outside the scope of the project but an intentional and functional ecosystem mapping was done to inform the framework development. The figure below outlines some of the critical stakeholders in the education R&D ecosystem. See Appendix B for a detailed list.

[1] *The Role of Knowledge Brokers in Education: Connecting the Dots Between Research and Practice, Edited by Joel Malin, Chris Brown*

Figure 7. Sector map

Based on a series of cross functional collaboration combined with synchronous and asynchronous input, a scientific methodology was developed. The final methodology adopted for the framework design is highlighted below:

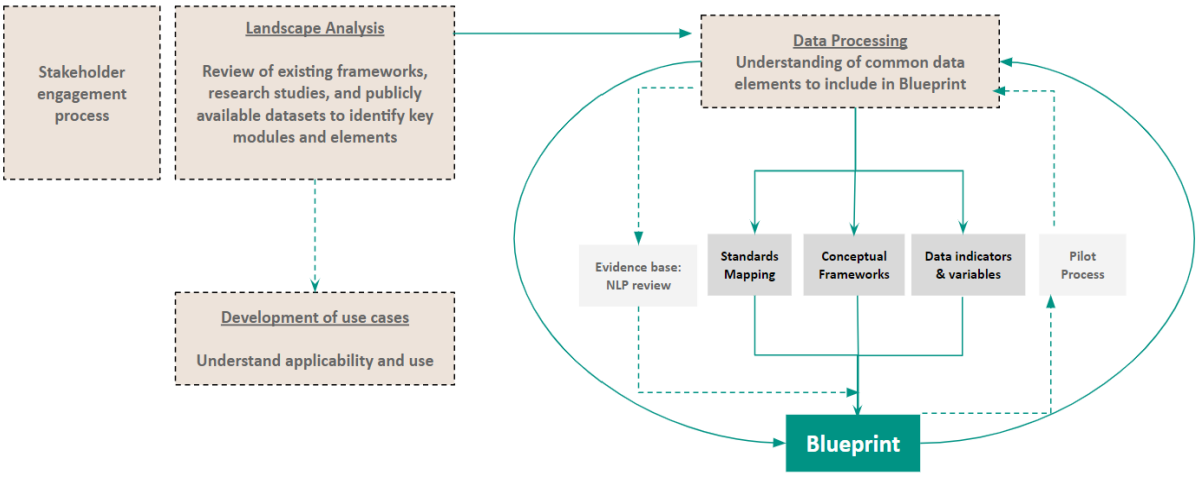


Figure 8. Methodology overview

The final methodology focused on core components that included:

1. A thorough and rigorous landscape analysis
2. Data processing of the compiled information to identify critical elements for stakeholder review and decisions
3. A review of the representative sample from established evidence repositories to understand the trend of thematic topics and gaps in the current evidence bases including journals and publications.

Like data profiles in healthcare, the data elements have largely been defined within existing standard bodies, conceptual implementation frameworks and taxonomies. The work of bringing together these known variables into a universal data framework entailed bringing together known and defined elements. Three main data sources were processed and analyzed to identify discrete elements for specifying education research data needs. The three data sources include the comprehensive and established education data standards, conceptual frameworks on key education domains, as well as publicly available databases and indicators. These data sources were specifically chosen to represent a diverse set of elements across different types of data in terms of usage, granularity and representation for data needs among researchers and practitioners in education.

Standards bodies and their extensive data coverage were used as a starting point for compilation as they are generally used as a common set of tools for standardizing research data collection and retrieval. These largely addressed variables to be considered in the PICO model: population (i.e. student demographics) and intervention (i.e. instructional method). While a number of data standards already exist, there is not a single data standard that captures the elements necessary.

The conceptual frameworks from different learning domains in the education field were used to map the data representing heterogeneity and contextual understanding, such as implementation fidelity. These were primarily used to inform contextual and implementation variables in enabling conditions such as technology, personalized learning, staff / adult learning and contextual setting for interventions. Publicly available databases and indicators were included to complete the exhaustive landscape analysis. The table below provides a detailed description of datasets used for the landscape analysis:

Table 1. Datasets used for landscape analysis

Data Source	Datasets	Total elements reviewed
Education data standards	10	6,438
Data indicators	17	8,964
Conceptual frameworks	30	1,843

Appendix C provides a list of all data sources used for the landscape analysis. All the elements within these sources were first compiled into an internal database. All the elements were then categorized into modules and sub-modules. For example, all elements related to student demographics were categorized into the "population" module and "student identifiers" sub-module. Inclusion and exclusion criteria were established for databases that had similar or overlapping information. The inclusion criteria for initial selection and identification were divided into three main categories:

1. **Relevant and Standardized for Education Research**
    a. Is this element relevant for advancing and modernizing education research?
    b. Is there wide agreement on the meaning of the element?

2. **Usage and Scale**
    a. Do most practitioners (state, districts, schools) collect this data with high fidelity today?
    b. Is this data currently collected at a wide scale?

3. **Data Collection: Real-time vs. Aspirational**
    a. Is the data collected currently?
    b. Is this element relevant enough that more research studies should report it or it should be researched more?

The list of elements that were identified and selected should meet two of the three criteria listed above. All the elements from the database were then closely reviewed to select 500 elements for further stakeholder review. Their definitions were sourced from the current definitions in the established sources for either federally mandated data indicators or in widely adopted or accepted frameworks. To enhance and enrich the Blueprint, these elements were further evaluated through a series of stakeholder reviews and iterative processes by a group of researchers, practitioners and industry leaders that represented multi-disciplinary fields in education and refined the resulting framework to represent education research needs.

The stakeholder review was conducted through a series of surveys that was administered to all members of the Working Group and Steering Committee to provide input, both quantitative and qualitative, on the selected elements. Such a process ensured a rigorous evaluation of the framework for relevance, applicability and scalability. Additionally, it refined the connections and cycles of modules and elements so that they can be generalized and be used in the sector widely.

The survey was administered in two parts to all members of the Working Group and Steering Committee. The first survey focused on elements or variables from the population module featuring

a compilation specifically focused on identifiers associated with student, grade, school, district and organizations in the school system. This was intended to tackle one of the biggest impediments in comparability of research findings, i.e., understanding the representative sample or population of the research it focused on and components of the demographic studied. The list of identified elements was large and relevant enough to merit a review on just these specific populations characteristics and variables. The second survey focused on variables associated with school models, school membership indicators, access to technology, academic performance across all assessments, discipline and behavioral indicators, family and community indicators as well as conceptual variables under personalized learning and social-emotional well being (SEL).

> Given the complexity of the social-emotional learning domain in education and the lack of consistency in the constructs, measures, indicators and their definitions, the Researcher Working Group was given the responsibility to oversee the design and the compilation process of the social-emotional module of the framework. The social-emotional well-being indicators were reviewed and selected through a rigorous system of selection and compilation that was reviewed and approved by the Steering Committee for inclusion under the outcome section of the framework. More details of the design and development of the SEL model can be found in the comprehensive report of the Researcher Working Group.

The survey participants were asked to review the identified data elements and their definitions to rate the relevance of these elements in context of education research and development priorities, as well as priority-rank order them to understand their relative importance against each other. The participants were asked to answer these questions relative to their role in the ecosystem and from the vantage point of their research priorities. The participants found it challenging to rank order elements' relative importance and felt a need for more consistent and structured definitions than what was provided from the available definitions in the research system. This not only helped identify which elements were of high relevance but also highlighted the gaps in the current definitions. Additionally, the survey asked participants to provide qualitative feedback on the process, missing elements from their perspective as well as gaps in the current definitions.

The participation rate was 83% and 53% for Survey I and Survey II respectively. For both surveys, I & II, a Likert scale was used to rate the relevance of the elements on the scale of extremely important to not important at all. The Likert scale was converted into quantitative data points. Percent of responses for each category was calculated followed by the median score of each category for all variables. The responses for all members who waived off were excluded. For each individual response, all questions that did not have a response were excluded in calculating the total number of responses.

For priority rank order, the percent of responses were calculated that ranked the variable in the top five of each module. This was followed by calculating the median of the distribution. For Survey I variables, the median was calculated for all variables in all modules combined. For Survey II, the median was calculated for all variables within each module separately. Family, student and school information modules were combined for calculation of median purposes. Discipline and behavior were combined for median purposes.

The following criteria was developed and used to select the elements from the surveys:

Table 2. Survey criteria

Criteria 1	● Code 'green' | extremely important: response rate >= median ● Code 'yellow' | very important & 'important: response rate >= median ● Code ‘red’ | low importance and not important at all: response rate>=50% (absolute)
Criteria 2:	● Code 'green' | response rate >= median

The final variables were selected based on the criteria highlighted in the table below:

Table 3. Element inclusion criteria

Draft Final	● Criteria 1: All ‘green’ variables ● Criteria 2: All ‘green’ variables
Borderline (for discussion)	● Criteria 1: All ‘yellow’ variables ● Criteria 2: All ‘red’ variables from criteria 1 that are ‘green’ based on criteria 2

This was further refined based on the qualitative feedback received by the participants. Detailed analysis and review was shared with the members of the stakeholder groups and an additional feedback loop was initiated to get the final comments. Discussion focused on generic and specific aspects of the modules and elements to capture qualitative feedback.

Generic questions included but were not limited to:

- How did you define these elements while processing them for feedback?

- How do we assess the current reality of how many are actually being captured vs. what should be captured and how consistently?
- How do we create a crosswalk for the same variables that are at different scales and levels, especially to do apples-to-apples comparison?
- What is the relevance of indicators in terms of decision making vs. research and evaluation?

Specific questions included but were not limited to:

- Student characteristics
  - How do we assess and include the standardized formats for all elements, student Title I eligibility vs. economic disadvantage status? Inclusion of both or one?
  - What is the criteria to differentiate between student race and ethnicity from the perspective of researchers vs. practitioners?
  - What is the difference between IDEA disability type vs. indicator? One is descriptive while the other is binary. Should both be included?

- Technology variables
  - How did you interpret indicators like implementation plans or adoption plans? Binary assessment or a detailed capture of the plan for fidelity?
  - Technical pedagogical knowledge as an indicator of tech access: is it too subjective and how should we capture it?

- Personalized learning variables
  - Should the data collection for these elements be binary or descriptive? If descriptive, how should schema capture these data elements?
  - Can the data be consistently collected over time by all types of schools (under-resourced vs. affluent schools)?

Qualitative information was captured to determine the final list of elements under respective modules and sub-modules. The figure below provides a schematic view of the identification review process, number of elements reviewed from each category and the final selection for framework development.

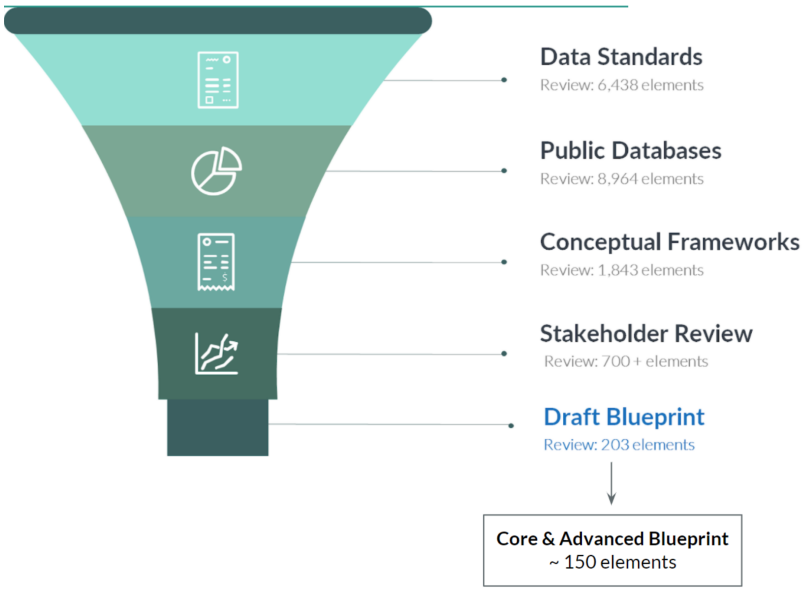


Figure 9. Landscape analysis element identification overview

The success of the framework was measured by three major criteria:

1. **Coverage:** The total number of elements mapped as a percentage of the total number of elements identified to represent the education data needed in the evaluation frameworks of other organizations.

2. **Understandability:** The assessment of clarity in definitions and understanding of the elements by other stakeholders. The precision, organization and ambiguity was assessed using qualitative and quantitative data.

3. **Generalizability:** The extent to which the elements, modules, and sub-modules are aligned to real-world application and experiences. The generalizability was calculated as a median of the coverage for all pilots and aggregated the scores of all pilots to determine the overall generalizability of the Blueprint.

The research design was further refined and aided by the use of natural language processing (NLP) techniques on the current research evidence base to understand the coverage of key topics and gaps that may exist. This process was initiated keeping in mind the gap between research and practice that exists in education research currently. While researchers are publishing research about useful changes needed in the classroom, educators are not fully translating the research into practice, thus not making these helpful changes in their instructional practices. Educators find it very challenging to

find beneficial research due the lack of discoverability and accessibility of pertinent research to their problems of practice.

With the main intent of building an open source data framework that all types of stakeholders can use and equally participate in evidence generation, this process enabled understanding of the current research evidence base in education to understand patterns and maturity models of research topics while also examining information gaps and influence models. The secondary literature review would provide data on different topics and themes that exist under education intervention research. It identified the most cited and high impact publications that allowed for mapping gaps in education research currently and variables from research papers typically collected during education intervention research.

Through the use of natural language processing techniques (such as topic modeling) on the current existing evidence base such as publications within What Works Clearinghouse (WWC), Education Resources Information Center (ERIC) databases and academic papers published in journals, we harnessed the power of existing evidence base to understand the dynamics of the evidence base, gaps which may exist, and how to identify opportunities for further research. These repositories as well as key education publications were used to conduct topic modeling analysis. Topic modeling analysis uses unstructured text to generate hidden semantic structures of related documents. This methodology helped the framework development by understanding the differences between high quality research and others by reviewing the rating criteria of the papers in WWC and ERIC.

Using more than 100,000 titles and abstracts from different publications in these databases, we were able to extract thematic topics that reflected the progression of research and validate critical data elements needed to answer a research question. The process disclosed the diversity of topics within these databases as well as revealed existing evidence gaps which can be a signal for more rapid cycle evaluations in the underrepresented fields. Furthermore, using AI techniques, this model connected topics and co-occurring topics with geographic locations and authors to show an overrepresented sample of schools and districts in the evidence base. We have observed semantic structural differences between different databases and identified core themes of high quality literature that will better inform the creation of a universal framework within education research.

A natural language processing analysis was conducted as part of a year-long collaboration between the University of Virginia, led by assistant professor Dr. Brian Wright, and the InnovateEDU team. The Researcher Working Group was entrusted with providing guidance on the methodology, process and findings of the review of existing evidence repositories to support the framework development. Detailed explanation of the design, findings and recommendations can be found in the comprehensive report of the Researcher Working Group.

6. Pilot Prototype

A critical part of the project was to prototype the framework into real-life application and integration. The framework was tested in field pilots by adopting a lean development approach focused on rapid cycle improvement. One of the main engagements of the Steering Committee was to identify and select the pilots from the ecosystem that are reflective of the real-world system and pressure test the framework for applicability and generalizability. The pilots were divided into two phases: alpha and beta pilots. Different organizations with unique representation of the education research ecosystem were identified. Learnings from alpha pilots were used to further refine the framework to create a testing bed for the beta pilot. This section will elaborate on the selection criteria, process of pilots and the learning and recommendations used in the development of the framework. More detailed pilot implementation, learnings and recommendations can be found in the Lessons Learned and Pilot Profiles report.

The selection of pilot programs was based on the technical capacity of pilot partners, clear and measurable outcome objectives measurable within the pilot, and agreeing to logistical and tactical implementation guidelines of the pilot. All pilot partners were also a part of the Bill & Melinda Gates Foundation R&D portfolio. Pilot partners were chosen strategically based on their stakeholder type, as well as the strong possibility of the pilot partner being able to use the framework for their own research needs in the future. The selection criteria are listed below:

1. **Data sharing agreement:** The organization is able to sign the InnovateEDU data sharing agreement. This included the FERPA and HIPAA compliance indicators in the agreement. The anticipated benefit was compliance with student security and privacy measures.

2. **Framework design participation:** The organization should be able to join the Working Group and commit to participating in the design of the framework. This ensures that the design process of the framework development is diverse, connected and inclusive.

3. **Design workshops:** The organization should be able to schedule co-planning meetings and design workshops with the InnovateEDU team. This facilitates customized use cases and presents the challenges of scalability within the pilot that can be discussed and solved.

4. **Data infrastructure:** The organization should have the technical capacity and tools to initiate, implement and use the draft framework. This ensures testing of the framework against different types of data infrastructure and data teams that validate the replicability and scalability measures.

5. **Progress monitoring***:* The organization, in collaboration with the InnovateEDU team, has the clear and measurable outcomes of the pilot. This was critical to understanding and testing for efficiency and effectiveness.

Based on the selection criteria, 11 pilot sites / organizations were identified and shared with the Gates Foundation. With critical inputs from members of the community and the Foundation, seven pilot sites / organizations were selected with three for the alpha pilot round and four for the beta pilot. In order to maximize testing and refinement of the framework, the first set of pilots was focused on the elements of the framework which test variables most closely associated with demographics, assessments and education technology. We prioritized pilots which 1) had an active research question which aligns to the three priority areas above, 2) had capacity or expertise in the areas of data science, and 3) had a clearly defined research question which can be answered without physical observation. To determine and test the use case, build a broad base of support for adaptability of the Blueprint, and act in accordance with the criteria mentioned above, the following organizations were selected for the pilots:

Alpha Pilot:

- Practitioner (school district): Great Oaks Charter School
- EdTech provider (evaluation and analysis): LearnPlatform
- Practitioner (research intermediary): Transcend Education

Beta Pilot:

- Researcher: Mathematica
- EdTech provider (instruction): Saga Education
- EdTech provider (student information system): Infinite Campus
- Research practice partnership: National Network of Education Research Practice Partnership (NNERPP)

The evaluation process entailed two distinct approaches:

1. **Approach 1:** Assess the applicability and coverage of the framework by cross-mapping the modules and submodules against the established evaluation framework of different pilot partners.
2. **Approach 2:** Instrument a research question with the partners using the population, intervention, comparison and outcome (PICO) framework and use the framework to identify and classify the elements needed for evaluation in the specific context of the research question.

The pilots tested and assessed for coverage, understandability, effectiveness, structural correctness, and generalizability and structural correctness. The success criteria and their definition is listed below:

- ***Coverage*** refers to the percentage of elements representing education research data needs. This is further enhanced by qualitative feedback and comments. The threshold for success is if 50% or more elements are mapped for relevant research questions in different domains.

- ***Understandability*** refers to the clarity of the elements by other stakeholders such as reviewers, pilot partners and adopters by differentiating elements from one module to another. The threshold for success is if 50% or more definitions of the Blueprint elements match with the partners' definitions.

- ***Generalizability*** refers to how well the element coverage exists across different education modules and different use cases (i.e., research questions). It is quantitatively defined as the median percentage of class coverage across modules of the Blueprint. The threshold for success is 50% or more of the median across multiple use cases on coverage.

- ***Structural correctness*** refers to the temporal flow and relationships among elements of the framework, the bi-directional and hierarchical relationships among modules, sub-modules and elements. The threshold for success is if it is evident that there are clear relationships between elements and modules.

For both pilots, the process was completed in five steps - onboarding, design, implementation, evaluation and feedback. During the onboarding, the pilot site and InnovateEDU laid out the terms of engagement and determined the team members who will be involved. The timeline of the pilot was mapped out, as well as the specific interaction needed by both teams throughout the duration of the pilot. For the design phase of the pilot, the pilot partner and InnovateEDU outlined what exactly will be tested and analyzed - whether it is a well-formulated research question, or an existing framework. Implementation and evaluation typically occurred concurrently, with data being collected and identified, and then assessed to conclude findings. Lastly, in the feedback process, the pilot partner and the InnovateEDU team reviewed the results of the pilot and assessed how well the framework performed in context of coverage, understandability and applicability.

The pilots were a helpful way of understanding the usability and the overall strengths and weaknesses of the framework. Pilots were a crucial component to understanding how the framework could be integrated into the current educational landscape. The pilot learnings directly influenced the design and building of the framework and changes to modules, element definitions and the overall organization were made in response to pilot findings.

Key metrics were calculated for each of the pilot sites based on the identified and chosen approach. Based on alpha pilot scores, the generalizability scores of the entire Blueprint was 62%. This was further enhanced to 77% based on the coverage and understandability scores of the beta pilot sites. For more details on the pilot learnings and recommendations, please refer to detailed pilot report Lessons Learned & Pilot Profiles report.

7. Finalize the framework

After much deliberation on appropriate naming of the project and the framework, the Steering Committee and Working Group gave broad consensus to the name of the project and the framework. The project was titled BIRD-E : ***Blueprint for Inclusive Research and Development in Education*** and the framework was titled the ***Blueprint.*** The word "inclusive" was an important part in the nomenclature process. It was important to signify that a large stakeholder engagement process was a critical part of the development to ensure an inclusive design process and collaborative community of practice.

The InnovateEDU team in collaboration with a communication partner designed the mission and vision statements that were reviewed and approved by the members of the community. The mission and vision statement of the project is showcased below:

Mission

BIRD-E brings together K12 leaders and stakeholders to design and develop a universal framework built on a common language to support and promote the development and accessibility of education research. We believe a common language of synchronizing research definitions, benchmarks, and metrics is necessary for evidence-supported interventions that impact student outcomes.

Vision

When there is an open exchange and common language for education research, we can modernize a shared education infrastructure where K12 educators and providers are able to give students more opportunities to benefit from evidence-based programs, resources, and services that will set them up for lifelong success.

The Blueprint contains a list of critical data elements that summarize and represent key education data needs in early childhood and K-12 education. It is a translational layer to improve articulation of data needs among researchers, practitioners and solution providers. The Blueprint provides a

framework to design a well-formulated research hypothesis and identify and articulate data needs to effectively evaluate impact of an intervention. It allows the reporting of findings in a consistent and structured format to make them accessible and discoverable. The direct beneficiaries of the Blueprint include researchers and research practice partnerships; solution providers; federal, state and local evaluation agencies; and decision makers in the school systems.

The Blueprint is divided into the Core and Advanced Blueprint. The Core Blueprint is a non-negotiable critical set of elements that facilitate structured compilation of data for efficient research evaluation and help understand the impact of intervention in improving student outcomes. The Advanced Blueprint contains elements that provide the opportunity for stakeholders to conduct more nuanced research and evaluation depending on the complexity of their research needs. The Advanced version of the Blueprint is an extension of the Core with elements that are more conceptual in nature and either need complex measurement tools or are not currently collected at wide scale, but are important to advance K-12 education research.

The Core and Advanced Blueprints comprise five modules: Population, Family & Community, Identification, Intervention and Outcomes. The modules are further divided into sub-modules that are inherently similar and the main distinctions lie at the element level which is the most granular level of the Blueprint. A structured and standardized definition for all elements in both Blueprints allows for consistent measurement across different types of evaluation and research designs.

The majority of the sub-modules and elements are student centered and can be aggregated at the class, school or district level. There is a substantial focus on the Population and Intervention modules. This is to emphasize the critical information needed to answer questions about what works for whom and how, and to help other decision makers identify interventions that would work best for their students based on the population characteristics and intervention details in the research studies that they review.

The figure below is the schematic representation of the Core and Advanced Blueprints.

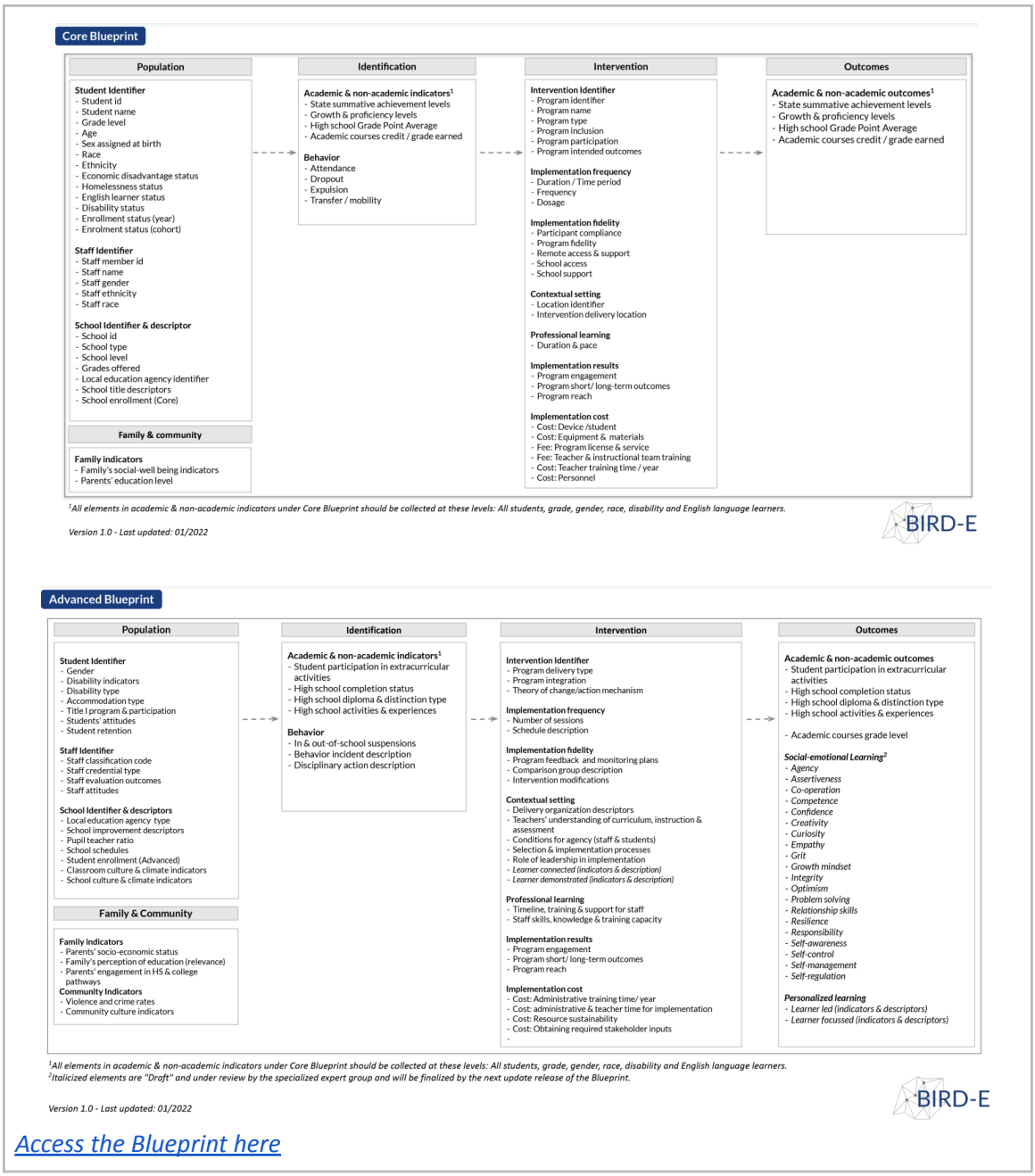


Figure 10. Core and Advanced Blueprint

In summary, it is also important to note that the BIRD-E project does not exist as its own entity. The BIRD-E project is a collaborative project. The Blueprint is not a compendium of all education data elements, but rather is a framework and guide to collect the most relevant and important education data elements. The Blueprint is not a technical specification, but rather tells the user what to collect in terms of their research hypothesis. It is an open source framework that focuses on assessing the

impact of interventions on teaching and learning and student outcomes and acts as a transitional layer between practitioners and researchers to identify and articulate data needs.

To further enhance the external engagement with the BIRD-E, a new website was launched to showcase the overall development story of the BIRD-E and the finalized version of the Blueprint. To aid the interaction with the BIRD-E Blueprint, a technical interactive platform was created by the InnovateEDU team in agreement with members of the community. The interactive web platform displays the Blueprint's elements with filter and selection functionalities. Access the main BIRD-E website and the technical platform here.

8. Communication and dissemination strategy

A detailed communication and dissemination strategy and plan has been developed by the InnovateEDU team and the communication partners. For more details, please review the "Communication Strategy" report submitted to the Foundation.

Recommendations for future growth strategy

SIgnificant developments are needed to refine the Blueprint and create models of adoption to truly make the BIRD-E project and the Blueprint successful. The future strategy of the BIRD-E project needs to focus on:

1. Ensuring that specific domains within the Blueprint are reflective of the current research space
2. Creating laser-focused messaging for each of the beneficiaries to truly reflect the benefits and value proposition for each stakeholder group
3. Articulating what the Blueprint is and what it is not, and be clear in the dissemination and adoption models
4. Designing processes and toolkits to involve stakeholders for rapid adoption.

The future of the significant development of the Blueprint and its robust foundation is three-fold.

1. The first growth strategy focused on the further refinement of the Blueprint as a framework through due diligence of evolving education research and its requirements. This will also entail use of the NLP technique to further explore the current repositories of evidence and education research to understand gaps and topics that are not covered by the current evidence base. This strategy also includes development of tools and credential pathways to further adopt and align with the Blueprint.

2. The second growth strategy is development of the right set of tools, assets, materials and incentives to support the adoption of the Blueprint.

3. The third growth strategy focuses on the dissemination, communication and adoption strategy to create awareness and support, as well as adoption by different stakeholders at scale. This strategy includes approaches that address the value proposition and the incentives for different stakeholders across the ecosystem.

This is further divided into two continuous cycles:

1. Assessing market demand and creating right incentive structures for each stakeholder type
2. Dissemination and adoption strategy for each stakeholder type

The three-pronged approach will lead to a comprehensive strategy to ensure the Blueprint is embedded into the ecosystem and add significant value to the R&D infrastructure. All the strategies support each other and integrate through communication and engagement channels. This will allow stakeholders to be aware, support and validate the Blueprint as a framework that increases efficiency in research and development in education.

More details of the recommendations and future growth strategy can be found in the "BIRD-E 3-5 year growth strategy" report submitted to the Foundation.

Conclusion

It is increasingly evident that education research is critically needed to improve our education systems and to open up opportunities for learning. However, our R&D infrastructure in education is woefully inadequate. Not only do we underinvest in the necessary infrastructure, education research is not currently structured optimally to impact educators' decisions. Educators and system leaders don't have access to the bodies of research and findings that could support high-quality teaching and learning and scholarship is too often disconnected from practice (and policy). Equity is often an afterthought or is measured in simplistic and reductive ways, which prevents effective implementation.

If our goal is for research to inform more equitable teaching and learning in education systems, then we must both invest in and reimagine R&D infrastructure in education. There is a need for new systems that help us answer questions about what works for whom, how and under what conditions. We need to create systems that facilitate data generation and the sharing of research findings, and improve the translation of research syntheses which will allow for better accessibility and discoverability of research by practitioners, researchers and policy makers for decision making.

The BIRD-E project used a data-driven approach to develop a conceptual framework - the Blueprint - for defining education research data needs. The resulting Blueprint is an open-source framework that aims

to modernize education research through a common, research-based data language to bridge the divide between research and practice in the K-12 data ecosystem. The Blueprint aims to provide a structured, universal and consistent approach to design, collection and reporting of research to answer the most pressing question of what works, for whom and under what conditions. It serves as a map to modernize current K-12 research, so that impactful research can not only be conducted -- but actually used.

The Blueprint can become the foundational R&D infrastructure needed to create a common comprehensive research framework and create a shared vocabulary to articulate research data needs. Its goal is to facilitate engagement of all types of stakeholders in inclusive, accessible and robust generation and use of research. The Blueprint focuses on supporting a learning system within the research and development infrastructure that evolves and considers usability in the practitioner community. It can facilitate communication between researchers and practitioners to ensure improved evidence generation as well as serve as a metadata schema to index and organize research evidence for better discoverability in the space of evidence synthesis. Further real-world adoptions and close studies are needed and warranted to test these potentials and serve the education sector.

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Appendix

Appendix A

Participation rates for all meetings during the framework development process.

Steering Committee	Attendance (2020 - 2021)	Attendance (2021 - 2022)
Adrienne Murphy	88%	50%
Alex Resch	88%	50%
Alka Pateriya	*	50%
Bart Epstein	88%	100%
Bi Vuong	63%	50%
Bill Hughes	75%	100%
David Nitkin	38%	100%
Erin Mote	88%	100%
Jeff Livingston	63%	50%
Joseph South	100%	100%
Karl Rectanus	88%	100%
Katrina Stevens	63%	100%
Matthew Soldner	38%	100%
Melina Uncapher	63%	50%
Paul Tearnen	75%	50%
Sean Talamas	63%	50%
Valerie Barton	63%	100%
Vivian Wong	25%	50%
*Excluded: Bryan Richardson | *Joined in 2021-2022*		

Researcher Working Group	Total Attendance (2020 - 2021)	Total Attendance (2021 - 2022)
Brian Wright	83%	0%
Cathryn Cook	*	100%
Christina Cipriano	*	50%
Cindy Tipper	100%	50%

Dave Paunesku	83%	100%
Erin Huebert	83%	100%
Erin Pollard	50%	100%
Gaby Lopez	67%	100%
Jessica Heppen	83%	0%
Neil Heffernan	*	100%
Paula Arce-Trigatti	67%	100%
Ryan Baker	*	100%
Sean Talamas	17%	50%
Temple Lovelace	100%	100%
Virginia Knechtel	*	100%
Vivian Wong	67%	100%

** Joined 2021-2022*

Some members were part of the steering committee and attended only one of the meetings whenever similar content was shared. They were pulled in as per need in the working group meetings.

Practitioner Working Group	Total Attendance (2020 - 2021)	Total Attendance (2021 - 2022)
Adrienne Murphy	38%	33%
Chelsea Waite	75%	100%
David Nitkin	50%	33%
Harpreet Gill	63%	67%
Howard Shen	88%	100%
Jake Firman	50%	100%
Karina Rodriguez	63%	100%
Kenneth Herrera	88%	100%
Leonard Medlock	88%	67%
Margeaux Randolph	63%	0%
Megan Benay	88%	33%
Michael Ricci	63%	100%
Roland Antoine	63%	100%
Sean Talamas	0%	33%

Some members were part of the steering committee and attended only one of the meetings whenever similar content was shared. They were pulled in as per need in the working group meetings.

Appendix B

[Link to view sector map]

The Blueprint for Inclusive Research and Development in Education (BIRD-E) Sector Map	
Professional Organizations	**Research-Practice Partnerships**
American Association of School Administrators (AASA)	Baltimore Education Research Consortium
American Federation of Teachers (AFT)	Cleveland Alliance for Education Research
Association for Supervision and Curriculum Development (ASCD)	CORE-PACE Research Partnerships
Council of Chief State School Officers (CCSSO)	Education Consortium on Research & Evaluation
Council of the Great City Schools	Education Research Alliance for New Orleans
EdLeader 21 - Battelle for Kids	Madison Education Partnership
International Society for Technology in Education (ISTE)	Milwaukee Public Schools
Leaning Forward	UChicago Network for College Success
Marshall Memo	University of Louisvile-Jefferson County Schools
National Association of Secondary School Principals (NASSP)	University of Wisconsin-Milwaukee
National Association of State Boards of Education (NASBE)	
National Education Association (NEA)	
National Headstart Association	
Advocacy	**District Level Research Services**
Common Sense Media	Northwest Regional Education Service District
EdSurge	Regional Data Centers
Knowledge Works	Regional Information Centers & Others (ESCs, ITC, etc.)
	Texas Education Agency
Foundations	**University Research Centers**
Annie E. Casey Foundation	ASSISTments
Arnold Foundation	Center for Education Policy Analysis (CEPA)
Bill & Melinda Gates Foundation	Center for Education Policy Research (CEPR)

Carnegie Corporation of New York	Center for Educational Leadership (University of Washington)
Carnegie Foundation for the Advancement of Teaching	Center for Urban Education Leadership (UIC)
Chan Zuckerberg Initiative	CREATE (UC San Diego)
Grant Foundation	Duquesne University
New Profit	EdRedesign Lab (Harvard)
New School Venture Fund	Houston Education Research Consortium
Next Generation Learning Challenges (NGLC)	Learnsphere
Overdeck	Los Angeles Education Research Institute
Patrick J. McGovern Foundation	MIST Project (Vanderbilt University)
Schmidt Futures	Multinomah County Partnership for Education Research
Schusterman Family Foundation	National Network of Education Research-Practice Partnerships (NNERPP)
Silicon Valley Education Foundation	Project for Education Research That Scales (PERTS)
Success for All Foundation	School of Data Science (University of Virginia)
Thomas B. Fordham Institute	Social-Emotional and Character Development Lab (Rutgers University)
Wallace Foundation	Tennessee Education Research Alliance
	The Abdul Latif Jameel Poverty Action Lab (J-PAL)
	UChicago Consortium of School Research
Think Tanks / Issue Based / Education Improvement	**Practitioners - Research Intermediaries**
Achievement Network	Alvarez and Marsal
BELLXCEL	Attendance Works
Cambiar Education	BARR Center
Center for American Progress	BELE Network
Connected Learning Lab	Campbell Collaboration
Data Quality Campaign	Character Lab

Digital Promise	Christensen Institute
EdReports	Collaborative for Academic, Social, and Emotional Learning (CASEL)
EdSolutions	Consortium for Educational Change
Education Development Center	EdTech Evidence Exchange
EF+Math	Edutopia
Fourpoint Education	Everyone Graduates Center
Future Ready Schools	Evidence for ESSA
Highlander Institute	John W. Gardner Center for Youth and their Communities
Instruction Partners	LEAP Innovations
Leanlab	LearnPlatform
Learning Accelerator	Manpower Demonstration Research Corporation (MDRC)
Mindset Scholars Network	Mission Measurement
Open4Learning	National Center for Restructuring, Education, Schools & Teaching
Proving Ground, Center for Education Policy Research	National Center for Safe Supportive Learning
Rennie Center	New Leaders
Results for America	Project Evident
Rise Network	Stanford-San Francisco Unified District Partnerships
Search Institute	STEPP Center (Northwestern)
Strive Together	The New Teacher Project (TNTP)
Teach for America	Transcend Education
Transforming Education	
UnboundED	
UPD Consulting	
Government Research Bodies	**Research Consulting Companies**
Education Resources Information Center (ERIC)	AEM Corporation

Institute of Education Sciences (IES)	American Institutes for Research (AIR)
National Center for Education Statistics (NCES)	Mathematica
National Institutes of Health (NIH)	National Drop-Out Prevention Center
National Science Foundation (NSF)	Philadelphia Education Research Consortium
Regional Education Laboratories	RAND Corporation
What Works Clearinghouse (WWC)	Research Alliance for New York City Schools
	SRI International
	WestEd

Appendix C

Table below provides a list of all sources that were used for the landscape analysis and framework development.

Input Category	Input Source
Data Standards	CEDS
Data Standards	ED-FI
Data Standards	A4L (SIF)
Data Standards	IMS Global (One Roster)
Data Standards	IMS Global (Caliper)
Data Standards	IMS Global (CASE)
Data Standards	PESC
Data Standards	DCMI/ Schema.org
Data Standards	CTDL
Data Standards	FERPA (Validation)
Data Indicators	NCES
Data Indicators	ESSA
Data Indicators	Evidence for ESSA
Data Indicators	SEDA
Data Indicators	SEER Cost analysis toolkit

Data Indicators	Core Components
Data Indicators	SLDS
Data Indicators	Common Core Database
Data Indicators	Civil Rights database
Data Indicators	CCSSO
Conceptual Frameworks	NGSS
Conceptual Frameworks	ISTE repository
Conceptual Frameworks	Transcend
Conceptual Frameworks	Leap Innovations
Conceptual Frameworks	Digital Promise
Conceptual Frameworks	CASEL
Conceptual Frameworks	ExploreSEL.org
Conceptual Frameworks	EEF
Conceptual Frameworks	Impact Genome
Conceptual Frameworks	Edtech Evidence Exchange
Conceptual Frameworks	Canopy Project
Conceptual Frameworks	Mission Measurement Taxonomy
Conceptual Frameworks	Impact Genome Taxonomy
Conceptual Frameworks	Project Evident (Evidence toolkit)
Conceptual Frameworks	Edreports
Critical frameworks (Other sectors)	USAID model for evaluation
Critical frameworks (Other sectors)	OHDSI
Critical frameworks (Other sectors)	HL7
Critical frameworks (Other sectors)	CONSORT SPI
Critical frameworks (Other sectors)	PRISMA
Critical frameworks (Other sectors)	SPIDER
Critical frameworks (Other sectors)	PICOS
Critical frameworks (Other sectors)	UTOS