Decision Theater®: A Proposed Collaboration with the Center for Advanced Studies in Global Education

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Introduction

The prevailing case for improving educational outcomes is often grounded in economic arguments. One such argument is that education improves the overall skills and abilities of the workforce, leading to more successful adaptation and use of new technologies, followed by greater productivity and economic growth. While economic indicators should indeed be a significant component of conversations about the impact of education, such a narrow focus overlooks equally important social indicators as health and well-being, civic participation, infrastructure, and environmental impact. More comprehensive metrics are urgently needed to reframe policy discussions about the role of education in the broader context of planetary concerns which are shaping global futures.

The problem is two-fold. First, most policy discussions rely on reports produced by multilateral organizations such as UNESCO, World Bank and OECD, which are predominantly driven by the economic imperative. While these reports provide an important entry point into understanding the impact of education, their analyses of such metrics remain constrained (usually linking education to economic growth), without considering the complex, systems-level connections between education and other aspects of life described above. Second, many countries do not have the capacity to conduct their own data analysis and therefore rely on policy recommendations provided by multilateral agencies, often disregarding the complexities of local knowledge, systems, and contexts.

Given the role of metrics in determining future programming related to inclusive and equitable quality education for all, there is an urgent need for a sustained international, interdisciplinary collaboration around global learning metrics that would bring together stakeholders representing different disciplines, political orientations, and normative frameworks so that current practices can be reassessed and recalibrated in light of alternative perspectives and innovative solutions. To advance this line of research, we propose a collaborative partnership between the Center for Advanced Studies in Global Education and ASU's Decision Theater®. The partnership aims to:

- **Contribute to the development of comprehensive and holistic global learning metrics** by aligning data vertically (linking national and global education assessments) and horizontally (integrating education data with relevant health, economic, environmental/sustainability metrics, as well as Gini Index, Entrepreneurship Index, happiness measures, etc.).

- **Facilitate global educational policy dialogues** by stimulating the generation, translation, visualization, and dissemination of salient knowledge on global learning metrics through latest computer and display technologies.

- **Provide leadership** on issues critical to global education and learning metrics by fostering professional networks and engaging in partnerships where joint action is critical.

- **Offer technical/consultative support and build sustainable institutional capacity of national governments** (ministries of education) in using large scale assessment data to inform national policy decisions.

Why use Decision Theater®?

The Decision Theater® leverages the accessibility and customizability of a Complex Systems Framework to link together multiple data sets and sophisticated mathematical models. Multiple modeling approaches are considered, such as conceptual models, spatial models, agent-based, stock and flow, stochastic, social networks, and others, depending on the questions outlined by stakeholders. High performance computational capabilities support analysis and simulation of big data, as well as large-capacity storage for tabular and object data with 300TB NAS of dedicated high-performance storage in the data center. The Decision Theater® Drum (Figure 1) is an immersive visualization environment with seven panoramic, QFHD displays for community engagements and facilitation of policy deliberation. However, user interaction need not be limited to ASU's Tempe campus. Because the primary user interface is created through web browsers, the resulting graphical dashboards permit interactive input and output in mobile multi-screen environments as well as across any desktop, tablet, laptop, or smartphone with an internet connection.

Figure 1. Dr. Jeanne Powers presents the Global Learning Metrics tool mock-up to attendees of the 2nd Symposium on Global Learning Metrics at ASU's Decision Theater®.

What type of problems can be explored using Decision Theater?

Complex, wicked problems—particularly those inspired by connecting education to other social systems—are not solved by single solutions. The roles of the Decision Theater® are to create data-driven models that help stakeholders understand the tradeoffs of different futures resulting from decisions made in the present, and to facilitate the creation and use of such models with diverse audiences and communities of interest. Previous areas of focus have been water use and regulation in Arizona and the environmental and economic effects of solar technology, as well as visualization of food, energy, and water supply chains across the United States. More recently, the Decision Theater® has begun developing multiple education-related projects with the Arizona Board of Regents, the Littleton School District, and the Helios Foundation to understand and improve education outcomes for the health and wellbeing of all Arizonans.

Decision Theater® Convergence Framework

The Decision Theater**®** collaborates with faculty and community partners to develop novel ways of framing related research questions and co-creating governance infrastructures which enable communities to detect changes in their environment, deliberate about potential interventions, and discover new ways of being in the world. The integration of stakeholders as co-creators exemplifies a transdisciplinary approach to addressing complex problems and convergence research. The DT upholds the convergence paradigm by *intentionally* bringing together intellectually diverse researchers and stakeholders to co-create research questions, develop effective ways of communicating across disciplines and sectors, adopt common frameworks for sustainable solutions, and when appropriate, develop new scientific vocabulary.

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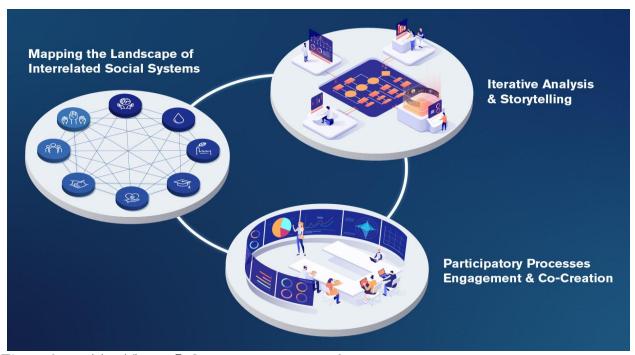

Figure 2. Decision Theater® Convergence Framework

Mapping the landscape of interrelated social systems. Rather than looking at education as an isolated social system, this initiative would create a deliberate and conscious effort to connect education indicators to other social system indicators, such as health and well-being, civic participation, workforce readiness, infrastructure, environment, and others. The connections between different social systems vary widely depending on the research question or issue being addressed and the person or community being represented in the room. Mapping the landscape of interrelated social systems in collaboration with researchers, policymakers, and the public is critical to gaining a more holistic, multifaceted understanding of the system of systems influencing the research question or issue at hand. An important first step to this initiative would be to bring together policymakers,

content area specialists, governance experts and civil society members to review and audit what existing data and models reveal—or overlook—about the connection between education and other social systems on a global level. The results of this audit will help determine whether existing data and models can contribute to the development of comprehensive and holistic global learning metrics or whether additional data should be collected and new models created.

Iterative analysis and storytelling. The Decision Theater® facilitates the co-creation of the next generation of models by connecting the values, perspectives, and expertise of stakeholders with modelers with expertise in mathematical and complexity science. Models and analyses are driven by stakeholder concerns to identify possible courses of action and quantitatively visualize the consequences of each. This process requires multiple iterations of discussion, data analysis, data visualization, model development and user testing. Stakeholders and collaborators identify appropriate model parameters, causal relationships, path dependent consequences of decisions, and alternative opportunities. Narratives for future scenarios regarding the impact of education on other social systems are then created and tested among various community audiences to gauge legitimacy, relevance, and salience of the analysis.

Participatory processes of engagement and co-creation. The iterative nature of the process described above is crucial. This initiative will bring together stakeholders from across the globe to imagine alternative futures regarding the effect of education policy on other social systems. This includes policy makers, ministry of education officials, UNESCO officials, OECD and IEA representatives, teacher union leaders, and education subject matter experts, among others. The repeated interactions between stakeholders, content area experts, the model, and Decision Theater® facilitators creates a richer understanding of the various futures and realities displayed in the model, as well as refines the model creation and analysis process. Interpersonally, the repeated engagements develop trust and credibility between the university and external communities. Through the course of these engagements, the Decision Theater® blurs the boundaries between different perspectives, stories, and points of view to engineer curiosity and promote empathy between community stakeholders with contrasting values who care deeply about the role of education in improving other social systems. For many collaborators, the process of working with other collaborators on creating a data visualization or interactive model is just as valuable as using the final model, if not more so.

Previous joint work between CASGE and Decision Theater®. The **Center for the Advanced Studies in Global Education** (CASGE) is an internationalization and globalization hub of Mary Lou Fulton Teachers College at ASU. The Center engages with people, institutions and ideas globally to address issues of educational quality and equity. We strive to develop and sustain collaborative networks across geographic, cultural and disciplinary boundaries to facilitate innovations that improve education. Over the last three years, CASGE organized two high-level international symposia on global learning metrics to measure education progress towards Sustainable Development Goals (mainly focusing on SDG 4). It has strategically positioned itself as one of the key players in policy debates on global learning metrics by convening and coordinating policy discussions among researchers, policymakers, test developers, and the broader education community, including top officials from Global Partnership for Education (GPE), UNESCO Institute for Statistics, UNESCO Global Monitoring Report, Education International, Open Society Foundations, as well as representatives of many universities, NGOs, and international development agencies (USAID, UNICEF, IEA, Chemonics).

This proposal advances momentum gained in November 2018, during the 2nd Symposium on Global Learning Metrics. Focusing on divergent perspectives about global learning metrics, the symposium brought together a select group of about 40 participants representing both test developers (e.g., UNESCO officials, OECD & IEA representatives) and users (Ministry of Education officials, teacher union leaders, political actors, and researchers). The goal was to better understand the current gap between the intended and actual use of metrics in the policy domain, as well as to contribute to the development of global learning metrics that are more contextually responsive, globally relevant, pedagogically innovative, and meaningful for national education stakeholders. Figures 2 and 3 show the visual mock-up used to drive conversation, as well as team member Jeanne Powers presenting the mock-up to symposium attendees in the DT Drum. Whereas the DT created a static mock-up with real-world data for the purposes of symposium discussion, efforts are now focused on bringing the mock-up to life in the DT Drum, driven by credible data, computational models and real-world scenarios to help users explore the connections between education and other areas of life on a global scale.

Figure 3. Tool mock-up connecting educational performance to economic, sociocultural, health, environmental, and life satisfaction indicators.