



**Understanding
Globaloria as the
Subject of Research:
An Agenda for
Future Study**

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Abstract

Edvantia, a nonprofit education research and development corporation was contracted in December 2008 by the World Wide Workshop Foundation to develop a series of *logic models* and a *research agenda* to guide future study of the Globaloria education intervention. Globaloria engages teachers and students in a collaborative social network for learning, to help them attain digital media literacy through the construction of video games around issues of educational and social importance. The intervention, based on constructionist principles of learning, has demonstrated early promise and is in its second year being piloted as a statewide model implementation in West Virginia, growing from 7 participating schools in the 2007-2008 school year to 14 schools in its current iteration.

Throughout the pilot, Globaloria-WV project staff members collected and analyzed substantial amounts of formative data, including pre-post program student surveys, wiki and blog system metrics, evaluations of wiki content and student products, documentation of communication with educators, and educator questionnaires. Although budget constraints and the intentionally formative emphasis of the data collection to date have not allowed for addressing questions of program efficacy, the Foundation and its partners are looking forward to investigation of the model's principles, processes, and outcomes. To this end, the Foundation commissioned Edvantia to undertake a qualitative study on which to base planning for such research in the future.

In this study, Edvantia reviewed available extant documentary evidence, such as project descriptions, evaluation reports, and participant artifacts. Content from these documents underwent graphical semantic analysis, through which researchers developed a series of inferred graphic representations of theories-of-action related to the Globaloria program. These *logic models*, ranging in scale from comprehensive to very focused, propose explicit interrelationships among program activities and outcomes. Because each relationship illustrated in a logic model describes one or more hypothesis associated with the intervention, the models help define potential research questions—the sum of which constitutes an agenda to guide future research into Globaloria.

It is Edvantia's hope that this research agenda will help to clarify the current state of understanding built up around the Globaloria model, more thoroughly explicate the theoretical grounding of the model, and identify emerging research priorities for the Foundation and other stakeholders. The proposed key research questions and associated studies described in this report are intended to provide a comprehensive roadmap for validating the principles, processes, and results of the Globaloria model, and to inform ongoing development and efforts to bring the intervention to greater scale within and beyond the state of West Virginia.

1. The Study: Understanding Globaloria as the Subject of Research

Edvantia, a nonprofit education research and development corporation, was contracted by the World Wide Workshop Foundation (the Foundation), to develop a *research agenda* to guide future study of its **Globaloria Network**, moving forward from the comprehensive Globaloria program pilot currently underway in West Virginia. This agenda was developed through a qualitative study of *documentary evidence*—reports and other publications, web content, internal documents, surveys and other data-collection instruments, and summaries of data collected by the Foundation staff during the pilot. These describe the implementation of Globaloria in West Virginia over a 16-month period ending in December, 2008. This body of qualitative information serves to describe the Globaloria-WV pilot as a *case* or instantiation of the intervention, intended by its designers to be an authentic, systemic, state-level implementation; situated among current education policy and program initiatives at state, school, and district levels; and intended to leverage education technology to further 21st -century teaching and learning in the state.

As Year 1 of the pilot came to an end in the summer of 2008, Foundation staff members and other stakeholders were growing increasingly confident that the *statewide Globaloria model* (a coordinated effort including sites across the state, also referred to herein as the *implementation*) showed promise. They arrived at an agreement whereby the number of pilot sites was doubled. However, as it is the Foundation's intention that the intervention eventually be scaled up to all secondary and post-secondary students in the state of West Virginia (and beyond), Foundation and state leadership recognized the increasing necessity that the program's efficacy be studied more deeply than had been possible during the pilot. In the fall of 2008, Foundation director Idit Harel Caperton decided it was time to define a research agenda to guide future study of Globaloria, and contacted Edvantia to bring an objective analysis to the project.

1.1. Purpose and Products of the Study: Defining a Globaloria Research Agenda

The Foundation was created in 2004 by Dr. Caperton, a Massachusetts Institute of Technology scientist with a particular interest in “using new-media technology for creative learning, innovation, and globalization through constructionist learning theory” [1]. The mission of the Foundation is “developing open-source applications of social media technology and game production, to enhance learning, innovation, entrepreneurship, and an understanding of the world in economically-disadvantaged and technologically-underserved communities” [2]. As a product of the Foundation, The Globaloria Network integrates several web-based *social media technologies* to cultivate) a bundle of Constructionist, Web 2.0 digital literacies among learners—both students and educators in middle schools, high schools, colleges, and alternative education settings [2].

Globaloria supports attainment of these aims by engaging learners in daily participation in an educational social network within which they design games using Flash software. Flash was selected by Globaloria designers because it allows students to “develop interactive projects that can be readily distributed, viewed, and played, in internet contexts” [3]. Students design their games on various educational topics—and learn the skills necessary to design and program them—using curricular

resources available on the network, through face-to-face and virtual collaboration in online environments using open-source web applications such as wikis and blogs. This approach aims to leverage the “social learning opportunities that creative internet environments facilitate” to develop a targeted set of learning abilities thought to be critical to prepare students for living and working in the 21st century [3].

Edvantia was engaged to undertake a qualitative study to develop an external perspective on the Globaloria Network and learning model as implemented in the state of West Virginia between August 2007 and December 2008. The intent of the study is that the results be used to inform ongoing development and implementation of the Globaloria model by proposing and activating a *research agenda* among stakeholders in education, in West Virginia and in other states where the Globaloria-WV implementation model might be replicated.

The study resulted in two outputs, the first being a series of *logic models* inferred from documentary evidence made available to Edvantia. The second is a set of proposed research questions grounded in those logic models, the sum of which constitutes a *research agenda* to assess the impact and rationale for bringing this innovative intervention to scale in West Virginia and other states.

1.1.1. Logic models: Logic models (sometimes referred to as *logic maps*) are graphical, semantic illustrations of program logic or *theory-of-action*—“an explicit theory or model of how the program causes the intended observed outcomes” [4]. For maximum utility in program planning, implementation, and evaluation research, a program theory should describe both the conceptual and action theories of a program [5] and serve as “a sensible and plausible model of how a program is presumed to reach its desired outcomes” [6]. Because program theories tend to be complex, they are most readily illustrated by graphic schemas. They may take a variety of forms, but to be effective must “clearly represent the presumed active ingredients of the program and how they lead to desired outcomes” [7]. Most pertinent to the research of education interventions like Globaloria, logic models can serve as “sets of principles and propositions to describe, assess, and defend the effectiveness of [the interventions’] behavior”—broadly stated, these assessments of effectiveness are the very purpose of education research [8].

For illustrative purposes, consider Figure 1 on the next page—a simple logic model inferred from the overarching hypotheses examined by the Year 1 Pilot of Globaloria implemented in West Virginia schools. These hypotheses relate to *Six Contemporary Learning Abilities* (or 6CLAs; digital literacy learnings targeted by the Globaloria Program, organized into a conceptual framework or typology) [3, 9]. The six CLAs are:

- Set 1: Invention, progression, completion of an original project: program an educational game, wiki, or simulation
- Set 2: Project-based learning in Web 2.0 environments and processing complex project management (programmable wiki systems)
- Set 3: Producing, programming, publishing, and distributing interactive purposeful digital media
- Set 4: Social learning, participation, and exchange

Set 5: Information-based learning, search, and exploration

Set 6: thoughtful surfing Websites and Web applications

Figure 1. Inferred Logic Model of Globaloria Year 1 Pilot Overarching Hypotheses

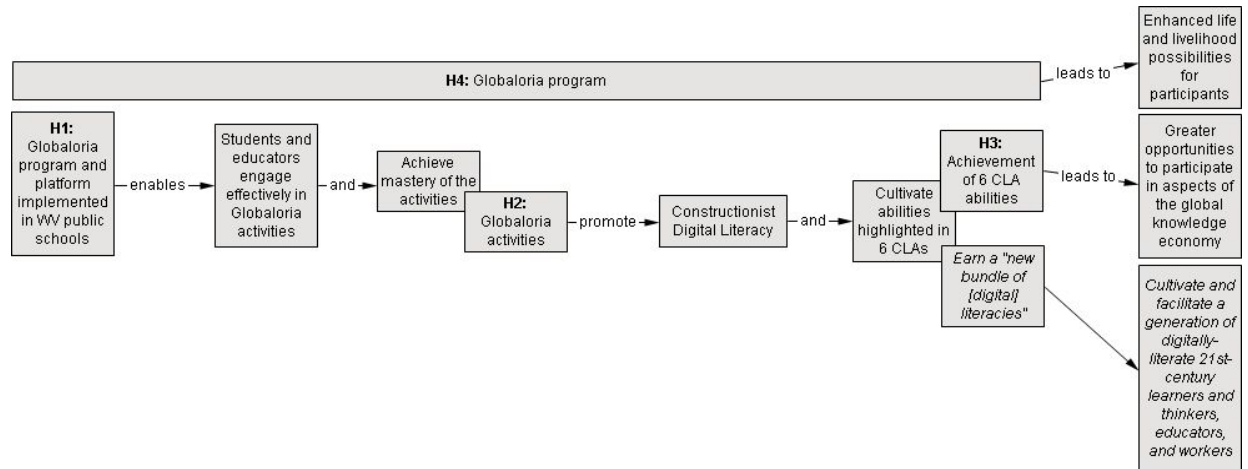


Figure 1 illustrates how a logic model might be used to organize research involving multiple, related hypotheses—or a research agenda—by guiding data collection and analyses intended to test various assertions. For example, to ascertain the extent to which hypothesis #2 (H2) might be supported, it is necessary to collect three distinct data sets related to (a) *the quality and quantity of delivery of Globaloria activities*, (b) *participants’ Constructionist Digital Literacy*, and (c) *abilities highlighted in the 6CLAs*. Any linkage illustrated in the model (shown by a line with or without arrowheads) represents the nexus between elements of an “if-then” semantic pair which theoretically represents one (very narrow) research question. If data attending to each of these question pairs are collected (e.g., the first linkage in H2, “Do Globaloria activities promote Constructionist Digital Literacy?”), then that individual theoretical link is tested. When all links stand up to testing, the model holds and confidence in the intervention is established. It should be evident from this hypothetical example that even a simple logic model can frame a large number of research questions.

It is of particular importance that a logic model clarify (a) what is within the conceptual frame of the intervention (and by exclusion, what is not), (b) what constitutes the “activities” or “implementation” of the intervention, (c) what constitutes “outcomes” or “impact” anticipated to result from the intervention, and perhaps most important (d) the line demarking implementation from impact. In the example above (Figure 1), “achievement of the 6CLAs” is within the frame of the Globaloria intervention: The more distal outcomes to the right are illustrated as though they are not part of the intervention (an inference from the Edvantia study), even though the third and fourth hypotheses examined (H3 and H4) posit relationships between elements of the program and those outcomes. There is also no clear demarcation between the activities in which educators and students engage, and the lasting outcomes hoped to result.

1.1.2. Research Agenda. The second product of this study is a research agenda—a proposed set of research questions or opportunities aligned with (a) the current state of research built up around the

Globaloria model; (b) the evident theoretical grounding of that model; and (c) emerging priorities of the Foundation, educators in and beyond West Virginia, education researchers, and potential funders of both implementation and research of the model.

A key finding from the Year 1 Pilot—the first statewide implementation of the intervention—was that the Foundation and Globaloria-WV team “lacked funding, locally driven self motivation and invention-spirit in the research area for Year 1” [9]. Although initial project funding did not support substantive research, the Foundation made considerable effort with limited staffing, to collect and use data for formative purposes. Given Globaloria’s complex theory-of-action, understanding of the intervention would benefit from the commitment of additional funding to support well-designed research of the intervention. A comprehensive research agenda should help the Foundation prioritize and organize funding of research into the Globaloria intervention.

1.2. Study Methods: Graphical Semantic Analysis of Documentary Evidence

The Edvantia study applied qualitative analysis to a collection of documentary evidence, including both published materials and internal documents provided by the Foundation staff members responsible for the vision and theory, concept and design, implementation, and initial evaluation of Globaloria. Where gaps or inconsistencies were discovered, additional data were collected by Edvantia, through loosely structured telephone interviews with key informants among the Foundation staff.

These informal interviews also served to *member check* emerging findings; that is, to ascertain the extent to which inferences and assertions made by Edvantia were consistent with Globaloria developers’ understandings of the model and its implementation. The purpose of this step was not to ensure that Edvantia researchers “get the right answer” as defined by the Globaloria creators; rather it was to help determine where the *model-as-intended* might differ from the *model-as-implemented*, or where misperceptions by Edvantia researchers might have impacted findings. Further, clarifying differences between Foundation staff members’ perceptions about how, and how well, Globaloria works, and independent inferences made by Edvantia researchers, can help define and prioritize future study of the model and the context in which it is being implemented. Finally, differences that might emerge between Globaloria inventors’ understandings and those emerging from the Edvantia study might provide direct formative feedback to inform ongoing development of the model and its implementation.

As documents were initially reviewed, semantic linkages described in the evidence were translated to a master logic model. This model, which grew to become a graphical representation of the entire Globaloria program, is oriented on a logical continuum (moving from left to right) adopted from Guskey [10, 11]. This continuum tracks the Globaloria theory-of-action from program-level activities by the Foundation; through West Virginia Department of Education (WVDE), district, and school administrative levels; to teachers’ dispositions, learnings, and practice; and finally to learning activities with students. Globaloria’s designers expect program and site-level activities are expected to translate into outcomes for students. Therefore, the logic model should illustrate the transition from “what Globaloria is doing” to “what students should be able to do beyond Globaloria.” Outcomes are illustrated in the model as ranging from immediate (those most *proximal* to the intervention), to long-term outcomes (those most

distal to the intervention) resulting indirectly from intervention activities or expected beyond the frame of the program delivery. Such outcomes include anticipated impacts on students' communities and the state of West Virginia.

The logic model framework illustrates temporal aspects of any given Globaloria implementation to some extent as well, since time must typically pass as the program moves logically from activities to outcomes. However, a logic model should not be confused with a timeline, which describes process steps tied to specific dates.

Each element (activity or outcome) parsed out of the documentary evidence was test-fitted into the master logic model where semantic comparisons suggested it best aligned within the overarching schema. As subsequent elements were added to the model, they either duplicated existing elements, added new elements, or conflicted with existing elements or linkages in the model. The negotiation and resolution of these relationships, inferred among the elements, reinforced the emerging model. Through this process, the logic model served as a tool to analyze the qualitative data examined by the study, to organize understanding of the entire Globaloria program.

As the master model become increasingly complex, it became unwieldy in its ability to clearly guide examination of the current state of understanding of Globaloria and development of the research agenda intended to grow that body of knowledge. As this happened, smaller logic models were “spun off” of the master. These models are included in the Appendix, illustrating six particular theories-of-action associated with Globaloria and the West Virginia pilot:

1. Context for the Globaloria Intervention: The Two Digital Divides
2. The Globaloria-WV Pilot Feedback Loop
3. The Globaloria-WV Pilot Implementation
4. School-Level Globaloria Implementation and Learning Outcomes
5. Globaloria Impact on Student Content Area Learning
6. Globaloria Distal Outcomes

To illustrate an even greater degree of detail, some smaller, more narrowly defined *micro-models* were broken out of those included in the Appendix. Micro-models appear as numbered figures in this report, in order to illustrate specific aspects of the study.

Once all of the documentary evidence describing the West Virginia Globaloria pilot had been analyzed using the modeling process, the documents were revisited to check again the extent to which the inferences illustrated in the master model—the physical arrangement of the elements—appeared to be consistent with the evidence.

Next, inferences were made regarding current understandings of the research state-of-the-art of Globaloria. These were based on the extent to which research evaluation *findings* described in the documentary evidence (a) assessed the quantity and/or quality with which *activities* illustrated as logic

model elements were implemented, (b) measured the extent to which *outcomes* (also illustrated as elements) were achieved, or (c) suggested that linkages between elements might be supported.

Finally, the emerging linkages among elements were illustrated, with solid lines indicating those tentatively supported by research described in the documentary evidence, and dashed lines illustrating semantic relationships particularly noted in document narrative content but not yet supported by data. An absence of linkages, among elements located near one-another left-to-right in the logic models but not actually connected by arrows, illustrates where relationships have been inferred from the narrative of documents reviewed. This latter situation is the case for a vast majority of the elements developed from the documentary evidence.

2. Globaloria: A Proposed 21st Century Constructionist Path to Digital Literacy

Foundation designers describe Globaloria as the next step in an evolutionary process of developing education interventions that integrate technology applications and a constructionist approach to learning. A constructionist orientation operates from the view that “building knowledge structures (‘in the head’) goes especially well when the subject is engaged in building material structures (‘in the world’)” [12]. Over the course of this evolution, the nature of the tools used to build those structures has changed as technology has advanced from construction sets with physical elements, like Tinkertoy or LEGO kits; to programming on standalone computers (e.g., Logo); to networks of computers including the Internet, that allowed shared efforts over distance; to, in the instance of Globaloria, the application of new web technologies that allow students to construct and share with others their own digital media products [13, 14].

2.1. Social Media Technologies: Beyond MySpace

Globaloria is a “social network for learning,” an online system intended to help students “master the tools of *social media technologies*, defined by the Foundation as “the new internet tools that enable people to create and edit information—in the form of words, photos, videos, animations, games, etc.—as a way to share experiences with one another on the web, thus creating a community of shared meaning” [15]. Globaloria program creators include as examples of social media technologies, popular web sites where users can connect with one-another through personalized pages that they create (e.g., Facebook, MySpace), and image- or video-sharing sites such as YouTube and Flickr.

2.2. Digital Literacy within Interactive Social Digital Communication: The New Reading and Writing

The digital environment of the 1990s has been referred to as *Web 1.0*; advances in technology and shifts in thinking among users have advanced the environment to the extent that it is now referred to as *Web 2.0*. The distinction hinges on users generating their own content, both consuming and contributing to digital communication: “Once you’ve learned how to use these social media tools as both a reader and writer—that is, as someone who contributes as well as observes—you’re digitally literate” [15].

Globaloria’s working definition of *digital literacy* rests on this important distinction, as the “New Internet” is based on a “bottom-up” approach that is “democratic in style, where all users have an equal

opportunity to actively engage in creating media and expressing themselves. It is a decentralized, open network that is designed to be participatory” [3].

Globaloria designers contend that today’s students must become digitally literate—*able to both consume and create digital content*—in order to become “productive, successful 21st -century citizens” and to “flourish in the community-style work environments they’ll encounter when they leave school” [15]. Further, this type of literacy is not viewed by Globaloria designers as “technology” or “elective” content: Taken to its full extent, the Foundation proposes that the Globaloria curriculum and instructional program will further digital literacy as “the new reading and writing skills” of the 21st century [13].

2.3. Digital Literacy within Contemporary Topical Domains: Students’ Global Lives

The Globaloria social network is constructed around six topics or themes, each of which is intended to be the basis for a *networked community*—a “purposeful, goal-oriented global community of young people” [15]. As of December 2008, three networks were operational and being tested in beta versions, including *MySLife* (wherein “s” is for “science”), in which students create games and simulations on the subject of global warming; *MyHLife* (for digital media content about health); and *MyGLife* (my Global Life, a network in which students “collaborate to innovate educational games” [15]. Three additional networked communities, *MyALife* (art), *MyMLife* (mathematics), and *MyRLife* (human rights), are not yet online.

Globaloria designers intend that these topical domain networks will put learning into contexts with substance and immediacy for students in Grade 8 and beyond. The Foundation staff envisions that digital literacy learning; and other affective, cognitive, and behavioral development desired for students; are best furthered by embedding activities in topics relevant to those students.

In August 2006, the Foundation developed its first platform in collaboration with a diverse group of 23 high-school-age youth in the Globaloria-Israel pilot project. In the summer of 2007 the Foundation launched a follow-on platform called *MySLife*, centered on the theme of the global climate crisis [3]. In the summer of 2008, the *MyHLife* network was piloted in a 6-week summer camp for students in New Orleans [15].

The West Virginia statewide pilot implementation that is the focus of this study operates within the *MyGLife* network, in which learning centers on global issues that may activate a range of math, science, or social studies content [13]. The *MyGLife* social network benefited from both technical and substantive real-world feedback, gained through two, one-semester pre-pilot development tests undertaken during 2007 and 2008 at the American University School of Communications. Students at AU provided valuable information on both the technology platform and the gaming curriculum, based on their experiences.

3. The Globaloria West Virginia Pilot: Developing a Statewide Implementation Model

In August 2007, the Foundation partnered with the State of West Virginia to launch the largest-to-date Globaloria pilot at seven diverse school sites across the state. Some of the WV sites are in communities with significantly economical disadvantages, and all are underserved in terms of technology capacity and infrastructure [3]. The Year 1 pilot represented a somewhat ambitious step toward a statewide implementation of the Globaloria intervention, and was expected to achieve six specific purposes [9]:

1. To inform development and implementation of the intervention, curriculum, and technology platform
2. To “set the groundwork for exceptional innovation in education that is transformational and scalable”
3. “To facilitate creative and innovative learning and knowledge development among participating educators and students”
4. To test and ensure the quality of components of the “platform, curriculum, ongoing student support, educator support, and professional training”
5. To ascertain whether the platform and curriculum are “flexible and suitable for a diverse set of educators, student age groups and grade levels, as well as styles of teaching and learning.”
6. To examine considerations related to sustainability and scaling of the program “within the public education system of the state for the long term”

The Globaloria-WV Year 1 pilot started in the fall of 2007 in seven schools, with 18 educators and school administrators and 89 students across West Virginia. Included were three high schools (one implementing the program as the basis of a for-credit course, and two as after-school enrichment opportunities), one middle school (as a for-credit course), at the Marshall Community and Technical College and Randolph Technical Center (for credit at both), and as an after-school club at the Crittenton Center for Girls [9].

In addition to providing an environment to nurture ongoing research and development of Globaloria, the Foundation targeted these schools hoping to “advance the state’s students and educators in their 21st century skills quickly and effectively, creating a program that has been proven effective and that will eventually be used by everyone everywhere in West Virginia’s schools, colleges, and homes” [15].

3.1 Context of the Year 1 Pilot: West Virginia as a Case of Globaloria

The Foundation staff chose West Virginia for the pilot because they understood the state to have low median household and per capita incomes (*high poverty* or *economically underserved* in the Globaloria lexicon) and to be largely rural, so not widely wired for broadband Internet access (*low connectivity* or *technologically underserved*). Due to lack of access, students appear to be unable or disinclined to participate in the use of social media technologies, thinking supported by a 2007 Pew Internet study of American teens. The Pew study found that rural students in less well-to-do families are less likely to be digital “content creators” than are their richer, suburban counterparts [3]. This dynamic defines what Foundation staff refer to as a “digital divide defined by digital literacy,” wherein students lack the capacity to “create as well as consume digital content” [15].

With 703 K-12 public schools (plus 34 institutional schools, 41 vocational schools, and 3 schools for the deaf and blind), and just 281,711 students; West Virginia was seen as providing fertile ground for the Year 1 pilot because it is small enough to manage an implementation and attendant study that Foundation staff members hope to scale up to include all schools in the state [16]. However, because Globaloria is intended to further digital literacy and other outcomes for students in Grade 8 and beyond, the constellation of West Virginia schools in which it might be implemented more correctly includes the 137 public secondary schools that include any grade from 8 to 12, plus the 10 institutions that make up the Community and Technical College System of West Virginia [17, 18].

It should be noted that only 2,109 of West Virginia students are English language learners, and the student population is 93.8% White [16]. Demographic homogeneity of this nature is worth bearing in mind. While it may indeed provide certain advantages in terms of piloting Globaloria (e.g., limiting the necessity to produce digital content in languages other than English), it could also impose limitations on the extent to which findings might generalize to more diverse populations. To counter this potential challenge to validity, the Foundation sampled purposively to select pilot schools that differed in terms of urbanicity and socioeconomic status of the student population, in order to achieve a pilot sample as diverse as possible [13].

Finally, Globaloria resonated with education, government, and business leaders in the state, who were sensitive to the need to develop a workforce positioned for future economic and employment conditions unlike any experienced by previous generations of West Virginians [19]. This rationale is in line with what Foundation staff members call “West Virginia’s legendary commitment to leveraging technology for educational improvement and economic development” [9]. The WVDE took a key step toward this commitment when West Virginia became only the second state in the nation to join the Partnership for 21st Century Skills (P21) in 2005. P21 is a national advocacy organization comprised of members from the business, education, and policy-making communities, collectively dedicated to developing “a powerful vision for 21st century education to ensure every child’s success as citizens and workers in the 21st century” [16]. State Superintendent of Schools, Dr. Steven Paine, signed onto P21 in November of 2005 in a ceremony attended by state political, education, and business leaders. Joining P21 committed West Virginia to a course that includes nine “steps to build momentum” and seven specific “strategies intended to implement a successful statewide 21st Century Skills initiative,” as defined by P21 [16].

A clearer understanding of Globaloria’s place in the West Virginia state context can be ascertained by aligning elements from the logic models to the state’s nine steps and seven strategies—establishing vision; data analysis, planning and process design; management and organization; standards and curriculum alignment; programmatic initiatives; technology integration; 21st century assessment; professional development; and collaboration with outside partners [16]. Connections between the logic models and WVDE frameworks are already emerging, although some are certainly more tentative than others at this time:

3.1.1. Establishing a 21st Century Vision. The WVDE has made substantial commitments of time and resources to its 21st century teaching and learning initiative, focused on furthering legislation, policy,

and funding for the integration of 21st century skills into the public school system, and securing consensus and buy-in at the highest levels of state government and among business leaders. The WVDE has issued guidance to districts and schools, aligned with *39 crucial elements* to help them activate the vision established at the state level [20]. Taken at face value, desired outcomes for educators and students that emerged as elements from the Globaloria logic model semantic analysis are clearly consistent with the vision and stated aims of the WVDE's effort: to build 21st century skills for school administrators and teachers, to help students become 21st -century citizens, and allow West Virginians to "participate virtually in the national and global knowledge economy" [15].

3.1.2. Standards and Curriculum Alignment. While a comprehensive alignment of Globaloria and WVDE outcomes is beyond the scope of this study, Globaloria's aim of improving students' "media technology literacy" [3] is clearly in line with the P21 recommendation that students gain *Information, Media, and Technology Skills* [21]. Globaloria designers argue that older frameworks targeting *Information, Communication, and Technology* skills (ICT) fall short of meeting digital literacy goals. Hence, the Globaloria curriculum and online system focus on empowering students to not only use the Internet, but to "originate digital content—that is, to write as well as read digitally, to express themselves systematically and creatively in a networked community, and to innovate and collaborate at once using social networks and social media technology" [15].

The emerging Globaloria logic model also identifies specific learning targets aligned with other 21st century student outcome areas, including:

- *Core Subjects and 21st Century Themes* (values of democracy and globalization, health as the focus of the MyHLife network, and increased social and political awareness)
- *Learning and Innovation Skills* (critical reading of interactive digital media; digital creativity and innovation; and a heavy emphasis on communication, collaboration, and teamwork)
- *Life and Career Skills* (self-determination and self-reliance, cross-cultural understanding, project management and leadership abilities, and resourcefulness).

3.1.3. Technology Integration. Globaloria meets a high standard in terms of the extent to which it integrates technology into student learning: It simply could not happen, absent the digital communication technologies it employs. The Globaloria curriculum asks students to "master tools of social media technology" not as an ultimate outcome, but as a means to a broad range of student learning and long-term outcomes, and ultimately to desired benefits for their communities and for West Virginia [3].

3.1.4. Professional Development. In the Globaloria program educators learn along with their students, using the same Web 2.0 tools, as they too "act in the role of game designers" [3]. The approach in West Virginia to educator professional development to support 21st century teaching and learning arguably applies more conventional approaches to teacher professional development—providing workshops (albeit increasing through online systems), promoting inclusion of 21st century skills in teacher education programs, and prescribing accreditation criteria of teacher education programs and requirements for teacher licensure.

Situated within the nationwide P21 and West Virginia 21st century skills effort, the Globaloria pilot becomes a *case*—an instantiation of Globaloria implemented in a particular context, understandings of which might reasonably be expected to translate to other economically and technologically underserved communities across the United States and internationally.

3.2. Funding of the Year 1 Pilot: A Public-Private Partnership

Seed funding for the pilot (\$50,000) was provided by West Virginia Governor Joe Manchin III in July of 2007, supplemented by a grant that same year from the Benedum Foundation (\$183,000) and support from Verizon West Virginia (\$50,000) a year later [15]. The World Wide Workshop Foundation also invested more than \$24,000 in direct expenses (e.g., travel), and contributed \$508,000 worth of in-kind services and products—primarily staff time and technology platform and curriculum licenses arising from prior development work funded by Cisco [9, 13].

3.3. Year 1 Pilot Data Collection: A Design-Based Research Orientation

To support the Year 1 Pilot, Foundation staff and cooperating researchers addressed “the *cognitive* (knowledge), *behavioral* (frequency), and *affective* (motivation) developments that result from engagement with Globaloria” [9, emphasis added]. Cognitive development was ascertained through examinations of student artifacts and performances, such as final game projects and their game presentations, and “written and spoken expressions of their knowledge over time.” Behavioral development was assessed by examining the frequency with which students interacted with web-based resources (wikis and blogs). Affective development was determined through pre-post surveys of students’ and educators’ perceptions and motivations. All of these data were examined across the entire statewide implementation, at the site level, and for individual student and teacher “exemplary case studies,” thought to be illustrative of particularly interesting aspects of the pilot [15].

The entirety of the first 16 months of the Globaloria-WV pilot was undertaken applying a set of principles known collectively as *design-based research*. Design-based research (DBR) might reasonably be thought of as an application to research of fundamental principles consistent with those guiding development of Globaloria:

- Pragmatism (designing and testing interventions that address current, real-world problems)
- Grounding in both theoretical and real-world contexts
- Integration (both into the intervention and in terms of methods applied)
- Flexibility
- Responsiveness [22]

Indeed, Globaloria’s designers think of the program as being in a state of “eternal beta”—always under development, based on ongoing collection of data [13].

3.3.1. Pre-Post Program Student Survey. Students were assessed both pre- and post-program in Year 1, to ascertain the presence of a range of constructs associated with affect, cognition, and self-reported

behavior. Results of analysis of these data show measurable differences in proximal student outcomes among sites and subgroups of students, perhaps influenced by contextual factors such as student age and prior experience with technology [23]. A mid-term student questionnaire was also implemented, to gather formative feedback for ongoing Globaloria program development. Semantic analysis afforded by the master logic model illustrates that the constructs assessed by student surveys align well with anticipated affective outcomes (general affect, enjoyment of technology activities), cognitive (self-reported knowledge of technology), and behavioral development (surfing, info seeking, socializing; project, publishing, idea generation).

3.3.2. Wiki and Blog System Metrics. Server data were mined to document student interactions with the Globaloria network (page views, edits, and updates), which “reflect effort put forth by students” [3]. Educators participating in the West Virginia pilot were also received instructions for accessing these online data and for documenting monthly activity to support student grading. Wiki metrics indicated an almost two-fold higher level of engagement (based on per student, per month measures) for students at the Randolph Technical Center, compared to students at the other six Year 1 pilot sites. Wiki activity was considered in case studies of individual students’ Year 1 experiences with Globaloria, and was analyzed by Foundation researchers to establish correlations between engagement with the program and other measures. As they translate to the master model, these metrics illustrate points in the theory-of-action where data are collected to ascertain quantitative aspects of students’ participation in Globaloria learning activities, such as the extent to which students “share ideas, questions, and progress using digital communication technology” [15].

3.3.3. Evaluation of Wiki Content. The content of students’ Profile and Projects Pages was evaluated using a scoring spreadsheet to document instances of specific content elements. Wiki content analysis also informed the 12 student case studies. These data sources fit well among the master model elements that describe student participation in learning activities, although some ambiguity exists as to whether these elements describe “what students should do” during those activities, or “what students should be able to do in other settings” after those activities are concluded.

3.3.4. Evaluation of Student Products. Students in the Year 1 pilot created 30 games, of which 13 were completed by individuals and 17 by teams. Of these 30 games, 13 addressed “traditional education subjects,” while 8 addressed “global social issues.” Nine of the games were considered to be “non-educational” [24]. Students at the two technical sites accounted for more than half of the completed games. Games were scored using a coding scheme that examined the use of 80 elements that might be expected in student-developed games. Game analysis results illustrate that MCTC and RTC students developed substantially more complex games, in addition to a greater volume of game content, than students at other sites. It is interesting that game evaluation results were consistent with wiki metrics (by site), suggesting that these may be correlate factors—that “use of the wiki may be a positive contributor to game design, and vice versa” [23]. Scores from the game analysis scheme can be used to assess aspects of student product quality associated with the logic model element illustrating that students “build original web games and simulations” [15]. These scores also represent a rapidly growing data set, as the pilot moves through Year 2 [13, 24].

3.3.5. Communication with Educators. Foundation staff members employed a variety of types of communication with Globaloria-WV educators (interviews, conference calls, and email exchanges; as well as conversation incidental to site visits). Qualitative data arising from these communications contributed to site/educator case studies and formative evaluation of the pilot implementation. Review of these data was beyond the scope defined for Edvantia’s Globaloria research agenda study, although it is likely that the data arising from these communications might inform inferences regarding a broad array of logic model elements and linkage, ranging from Affective Teacher Learning Outcomes to Student Distal Outcomes. (See for example, the School-Level Globaloria Implementation and Learning Outcomes map in the Appendix.)

3.3.6. Educator Questionnaires. Educators’ motivation (confidence, enjoyment, and value), understanding, and use of technologies related to Globaloria were assessed at the beginning of the Year 1 pilot [25]. Educators also completed formative feedback questionnaires following professional training activities, designed to document their interest in and enjoyment of activities. Semantic analysis indicates that these instruments align well with targeted teacher affective, cognitive, and behavior development (consistent with the 6CLAs). Self-reported behaviors extend from personal uses of technology to uses in professional contexts (e.g., supporting students in planning and project-managing their digital design projects).

3.4. Use of Formative Evaluation Findings: Using Data to Improve Globaloria

Three of the six purposes of the Year 1 Pilot describe formative uses of data, to inform ongoing improvement of aspects of Globaloria including the “platform, curriculum, ongoing student support, educator support, and professional training” [9]. The Foundation’s Year 1 Pilot report and other documentary materials provide ample evidence that feedback actually resulted in extensive changes to the platform and curriculum [9]. While Foundation staff undertook data-collection activities that were clearly intended to inform development of the Globaloria platform, curriculum, and program (e.g., educator professional training feedback and student mid-term questionnaires) is not always clear in the evidence which data were applied to guide these changes. Nonetheless, an iterative development approach supported by informal or anecdotal data and real-time feedback is completely appropriate in a first-year implementation. A range of specific formative recommendations for Year 2 are described in the Year 1 Pilot report, and included such suggestions as increasing professional development and support for both teachers and students (p. 29-30). The report also specifically formalizes the recommendation that Globaloria be integrated into the regular school day “as a course for credit with grades” (p. 30), based largely on the positive differences in student engagement at sites implementing Globaloria in that fashion.

3.5 Impact Findings: Untapped Potential for Future Research

The Year 1 Pilot report unapologetically explains that Foundation staff and researchers are “not yet in a position to demonstrate impact,” in large measure because budget limitations restricted substantive research into the ability of the intervention to influence student outcomes [9]. Given that the intervention was in its first year of statewide implementation at the time, it would have been

unreasonable to expect substantive outcomes for students. A public statement from the Partnership for 21st Century Skills states its position on the question of time to achieve student impact outcomes: “[P21’s] work with member states involves a thoughtful, detailed implementation period, as it takes several years to fully impact standards, assessments, and professional development. State plans reflect that this isn’t an all-at-once movement. It is clear that ensuring students receive the knowledge and skills they need will not happen overnight, nor do we think it should” [26].

Finally, an apparent lack of substantive concern with establishing the efficacy of the intervention as part of the Year 1 pilot is appropriate. It appears consistent with the design-based research paradigm wherein aspects of implementation continue to be fluid and the program, curriculum, technology platform, and student and educator support undergo substantial change over the course of the pilot. Hence, any inferences about outcomes beyond those most proximal to the implementation would rapidly become stale as the Globaloria design evolves. This evolving nature of the Globaloria intervention will likely present challenges for the Foundation and researchers, as stakeholders might reasonably come to expect the model at some point become “fully developed,” and that efficacy be demonstrated. For now, both present interpretations of findings and plans for future study will have to consider the design-based orientation of Globaloria’s creators.

3.6. Randolph Technical Center Pilot Site Case Study: An Argument for Logic Modeling

The Year 1 Pilot report makes an assertion that might be interpreted as ascribing impact, based on a case study of the Globaloria implementation at the Randolph Technical Center (RTC), in Elkins, WV. Implemented as an “integrated class” offered daily for credit (and subsequently cited as an exemplary model recommended for Year 2 implementation) the RTC site case yielded significant increases in students’ frequency of engagement in activities supporting the 6CLAs. Increases in affective outcomes were also documented, including *enjoyment*, *confidence*, and *motivation* associated with Globaloria activities.

The increases in activities measured between pre- (September-October of 2007) and post-tests (December 2007-January 2008) might be considered unremarkable, however, as those activities were in fact part of a course’s required curriculum. It is laudable that this question arises in the report’s discussion of the case study, suggesting that “we need to learn more about the relation between grades and motivations” [9]. Moreover, it is difficult to make a distinction between the *activities* aligned with the CLAs that students were directed to undertake as part of teacher instruction, and any lasting *outcomes* documented for students.

Therefore, suggestion that the RTC case study findings support the hypothesis that Globaloria leads to “enhanced life and livelihood possibilities” for participating students (H4 repeated below in Figure 2) might seem to be an overstatement. More likely, though, it is an artifact of a lack of explication (or imprecise description) of the theory-of-action tested by the data gathered around the “overarching hypotheses” identified for the Year 1 pilot [9].

Figure 2. Micro-Model Alignment of Globaloria Pilot Hypotheses to the RTC Case Study Assertion

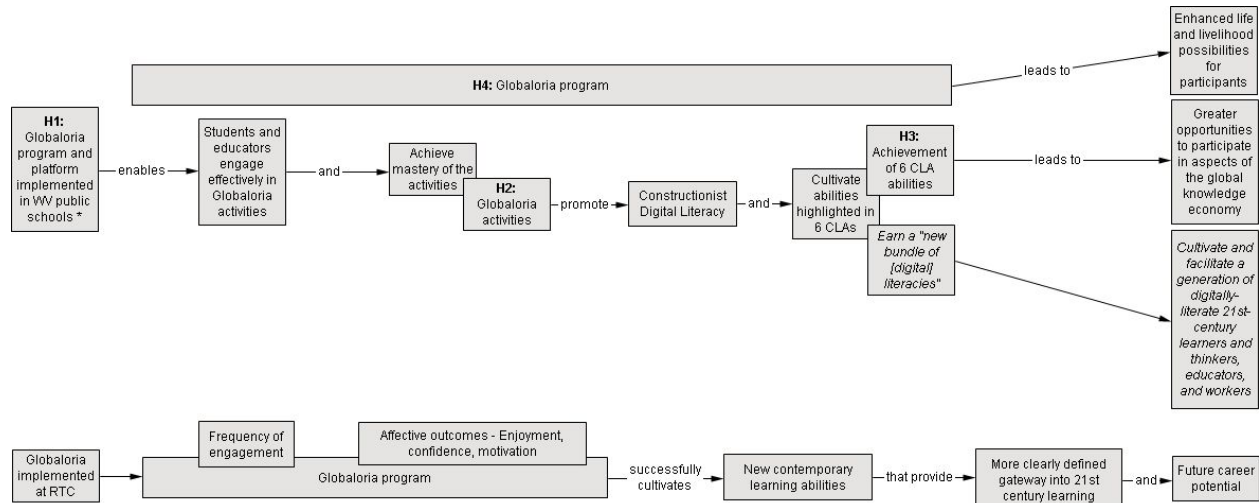
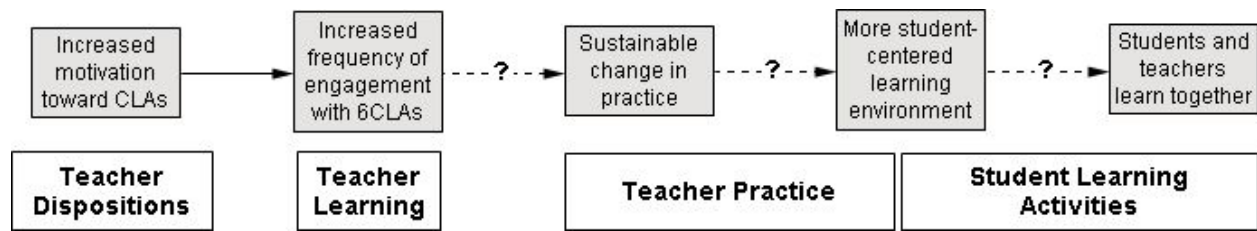


Figure 2 aligns the stated Year 1 Pilot study hypotheses logic model with another that describes the assertion arising from the RTC case study that, “The Globaloria program successfully cultivates new contemporary learning abilities that provide students with a more clearly defined gateway into 21st-century learning and future career potential than they would otherwise experience” [9]. Data were collected examining “frequency of engagement” (games created, wiki activity, and file uploads) and a range of affective outcomes for students (from surveys and student reflections). The data might simply indicate that students undertook Globaloria activities as directed by teachers, and they enjoyed doing so.

Educators at RTC also reported positive changes in the frequency with which they engaged in targeted activities aligned with the CLAs, and similar changes in their “motivations” for doing so [9].¹ However, suggesting that “increased motivation also speaks to a sustainable change in practice and possibly a move toward a more student-centered learning environment in which students and teachers learn together” would seem to overextend inferences from the findings [9]. Figure 3 presents a logic model reflecting a hypothesis supported by the RTC case study educator data—that increased motivation among educators is associated with increased frequency of engagement with the CLAs. However, the extent to which linkages to teacher practice and student learning activities are supported is still an open question (illustrated by dashed linkages), based on the data presented in documentary evidence.

¹ Educator survey items addressed activities (e.g., “designing graphics on a computer”) using a three-pronged conceptual framework addressing “confidence,” “enjoyment,” and “personal value.”

Figure 3. Micro-Model of the RTC Case Study Educator Assertion



These examples are not cited to level criticism on Globaloria, the Foundation, or individuals who contributed to the Year 1 Pilot. Instead, they highlight the importance of defining explicit theories-of-action and of aligning research data-collection strategies to hypotheses grounded in the semantic relationships among elements of the Globaloria logic model.

3.7. Mid-Year Status of the Year 2 Pilot: Expanding Implementation and Data Collection

Year 2 of the Globaloria West Virginia pilot (aligned with the 2008-2009 school year) expands implementation to 14 sites across the state, adding three middle schools, three high schools, and an alternative learning facility serving students in Grades 6-12. Because the seven Year 1 sites are continuing to implement Globaloria, this brings the total number of participants to 30 educators and more than 330 students across West Virginia [13, 15]. This growth can fairly be viewed as substantial, particularly in light of the fact that the cash funding base increased only approximately 25% over Year 1, with support from the Benedum Foundation, the WV Governor’s Office, and Verizon [9]. As noted earlier, Foundation and Globaloria-WV team staff made substantive changes to the pilot implementation model for Year 2. For example, it is important to note that the Globaloria program is offered as a for-credit course at all but 2 of the 14 sites.

Data collection continues for Year 2, with students at both new and continuing completing another pretest. It may be noteworthy that, at the end of the first semester of pilot Year 2, MCTC students reported mean levels of home computer use as much as five times higher than students at other Year 2 sites, and approximately 30% higher than the next-highest school mean, reported by the Pressley Ridge alternative school. Self-reported scores related to the 6CLAs varied somewhat less, particularly in terms of surfing and information seeking (CLAs 5 and 6). Students’ self-reported levels of knowledge related to other CLAs addressing creation of digital media (publishing and project-based creation) were lower than levels for of CLAs addressing consuming online content. Analysis of game data also shows that student product development has increased in volume and in terms of focus: In the first half of Year 2, students have initiated 80 game designs, almost half of which address the global social issues targeted by the MyGLife network [24].

Planned data collection activities for the winter and spring of 2009 include (a) content analyses of Web games, wikis and blogs; (b) ongoing analysis of wiki metrics; (c) a mid-program survey of students, revised based on lessons learned from Year 1; (d) implementation of the Year 2 pre-program survey with students starting 2nd-semester Globaloria courses; and (d) a post-program survey for students completing 1st-semester courses. Because, if anything, management and communication to support the

Globaloria-WV pilot have improved since Year 1, it is reasonable to anticipate that the effective use of these data to inform Globaloria development will continue.

3.8. Anticipated Next Steps of the WV Implementation: Evolving the Globaloria Model

Even as Year 2 of the Globaloria-WV pilot is underway, objectives for the 2009-1010 school year have been established by the Foundation [19]:

- Propagate students and educators from many more schools, in many more districts, into the WV MyGLife network.
- Add additional Globaloria groups within schools already participating in the pilot. Discussions during Year 2 suggest that some schools are already experimenting with running more than one Globaloria class concurrently.
- Expand groups at pilot schools to include some that integrate Globaloria into core content area courses (e.g., social studies and writing) rather than in technical settings.
- Encourage the WVDE to become directly involved in the pilot and support Globaloria implementation statewide, with policy decisions and funding.
- Encourage WVDE to improve connectivity bandwidth and to upgrade school computer hardware and software to facilitate this type of 21st century learning and teaching in all schools in WV.
- Push to develop virtual MyGLife communities of educators and students that are not directly affiliated with schools or classes and focusing on real-world problems.
- Build, improve, evaluate, and leverage Globaloria-WV as a model for replication in other states, then the world.
- Build new research methodology consistent with the Foundation’s mission and the first principles of Globaloria.

4. A Globaloria Research Agenda: Toward a Research 2.0 Orientation

Edvantia’s graphical semantic analysis of documentary evidence provided by the Foundation strongly suggests that its design-based research approach, as implemented over the course of the first 16 months of the Globaloria-WV pilot, has been undertaken appropriately. A wide range of data have been collected and applied to formative purposes, informing the ongoing development of the technology platform, curriculum, and program as implemented in the West Virginia statewide model. However, while some imprecise, or possibly optimistic, narrative language in the body of evidence provided suggests the achievement of substantial outcomes, study of the Globaloria-WV model has not yet advanced to a point where much can be said about whether it is making a difference in terms of persistent, transferable cognitive, behavioral, or affective outcomes—new or different knowledge, skills, or dispositions for teachers or students. While progress toward demonstrating impact has been constrained by a lack of funding, but it should be recognized that this situation is consistent with the Foundation’s design-based research orientation and the anticipated timelines over which Globaloria’s theory-of-action predicts those outcomes.

This Edvantia study resulted in a master logic model, the scope of which is great enough to make it an unwieldy tool for describing potential research studies of Globaloria. Given this, smaller logic models (again, illustrated in the Appendix) have been parsed out of the master model, to illustrate more palatable pieces of the entire range of theories-of-action associated with Globaloria and the West Virginia statewide implementation (again, presented in the Appendix). The micro-models included in subsequent sections of this report illustrate a number of the key questions arising from the qualitative analysis undertaken by Edvantia, posited as tentative starting points for further research.

Implications for ongoing use of the master model as a living document are provided below with the intent of framing organization, discussion, and pursuit of a potential research agenda framed by these questions. It is anticipated that Globaloria will provide a wide range of research opportunities, which might be pursued in order to ascertain the impact and rationale for bringing the Globaloria-WV statewide model to scale.

4.1. The Logic Model: Picturing Future Research into Globaloria

Edvantia's review and analysis of evidence documenting the Globaloria-WV pilot resulted in an extremely complex master logic model, comprised of more than 300 elements with scores of potential semantic linkages among them. While review of each subsequent evidentiary document often added elements to the master logic model, very few conflicting elements were identified and no evidence of contradictory logic emerged during the study. This suggests a high degree of *program coherence* within the Globaloria program—consensus among Foundation staff members responsible for generating the content reviewed, in terms of the language describing elements or the logic of the espoused theory-of-action described by the evidence [27].

The volume of elements described in the master logic model make it clear just how complex—or comprehensive—the Globaloria model is, as implemented in the West Virginia pilot. Further, very few of the semantic linkages, each of which represents a potential hypothesis to be tested by research, are established by data collected to date. While linkages are described in documentary evidence (again, as part of the model-as-intended), most have not yet been reinforced by the Foundation's research. However, the lack of hypothesis testing to date should not necessarily be viewed as a substantial problem. Many of the linkages, although not explicated in the evidence examined by this study, are likely supported to some extent or another by existing research, given that the Globaloria designers' knowledge of relevant theoretical work on digital literacy is evident in the body of evidence reviewed.

Given this, it is recommended that Foundation staff consider adapting theoretical or causal frameworks from existing planning materials, such as past research of Foundation principals or reviews of literature pertinent to Globaloria development, to the master logic model. Because the master model is managed in a semantic mapping software application, it is possible for Foundation staff to annotate the elements and linkages to reflect existing studies cited in literature, as support for the hypotheses illustrated. Doing so would establish where sufficient research exists to increase confidence in individual linkages, to shore up the overarching model. Elements or linkages for which sufficient research is not evident can

help define gaps in the collective understanding of the model, so can serve to establish priorities for research.

4.2. A Conceptual Framework for Research Agenda Studies: Levels of Study

The U.S. Department of Education’s Institute for Education Sciences (IES) has described a taxonomy intended to organize and focus research studies that “identify, develop, and evaluate education interventions—practices, programs, and policies—intended to improve the quality of education” [28]. Edvantia recommends adopting the IES conceptual framework shown in Table 1 to guide the Foundation’s development of research questions and studies based on the master logic model derived from the semantic analysis.

Table 1: IES Levels of Education Research Study, by Purpose [28]

Level	Purpose of the Study
<i>Identification</i>	Identify existing programs, practices, and policies that may have an impact on student outcomes and the factors that may mediate or moderate the effects of these programs, practices, and policies
<i>Development</i>	Develop programs, practices, and policies that are theoretically and empirically based
<i>Efficacy</i>	Evaluate the efficacy of fully developed programs, practices, and policies
<i>Impact</i>	Evaluate the impact of programs, practices, and policies implemented at scale
<i>Validation</i>	Develop and/or validate data and measurement systems and tools

These *Level of Study* descriptors can be applied to differentiate among the types of research represented by emerging opportunities, to clarify discussion and planning, and to guide the selection of appropriate research methods necessary to undertake future studies of Globaloria.

While Edvantia does not presume that IES will be a primary funder of the Globaloria research agenda, this conceptual framework allows the Globaloria agenda to be framed using language familiar to the U.S. Department of Education, to other potential funders, and to researchers and consumers of education research familiar with the distinctions among the levels of study. In essence, the Globaloria-WV Year 1 Pilot was a *development study* in the IES lexicon, wherein the quantities and qualities of program delivery were examined at the participating West Virginia sites, accepting that Globaloria is in fact theoretically and empirically based. Presentation of the following possible studies within a Globaloria research agenda are described in the IES terms.

4.3. Key Questions Arising from This Study: What We Do Not Know

The Edvantia study revealed a range of potentially interesting studies that the Foundation or other research entities might pursue. A variety of research questions to guide such studies is presented below, each with complementary logic models illustration parsed from the master model where appropriate. Potential data sources and preliminary suggestions about study methods are noted in alignment with elements and linkages from the figure, where appropriate.

To what extent is West Virginia a “leader” in technology-in-education and/or 21st century teaching and learning?

The Globaloria-WV pilot is predicted on, and implemented in the context of, a number of assumptions regarding the quality of implementation and the impact of the WVDE’s “comprehensive framework of policies, strategies, and resources to implement 21st century learning and instruction” [16]. This question could be addressed at various levels, from implementation quality and/or impact evaluation research studies of individual initiatives supported by WVDE, to a substantial statewide evaluation of West Virginia’s effort. These studies might be aligned with the theories-of-action described for Globaloria by the master logic model, to further contextualize understandings arising from ongoing study of Globaloria or the model supporting its implementation in West Virginia.

It might also be possible to determine, through analysis of extant data, how West Virginia compares to other states. It would be necessary to identify conceptual frameworks for this type of comparison, consistent with theoretical assumptions, strategies, and goals common to the states being examined. A study of this nature will be substantially simplified when technology literacy becomes part of the National Assessment of Educational Progress (NAEP, also known as the Nation’s Report Card), anticipated to occur in 2012 [29]. However, opportunities for comparisons might exist in data released in state or district reports.

Studies of this nature are likely beyond the scope defined by the purpose established for the Edvantia study, but would provide substantive context for examinations of Globaloria effectiveness

How does Globaloria compare to, or integrate with, other programs intended to enhance 21st century learning for educators and students in West Virginia?

The WVDE has committed to implementing the *techSteps* program in every K-8 school in the state. *techSteps* is a program intended to provide “planning, teaching, and assessment of K-8 technology literacy” to help students “build their own information products using real-world software applications...in an integrated 21st century context, reflecting the new models of active learning and higher order thinking that are essential to a 21st century learning environment” (p. 2) [30]. Taken at face value, *techSteps* would seem to be intended to further similar outcomes to Globaloria but for students younger than those for whom Globaloria is intended. A range of studies might be undertaken to address how these—or other—interventions being used with West Virginia students compare with, complement, or potentially conflict with one another.

An initial identification study might examine the extent to which interventions are in fact similar, in terms of theory and first principles, strategies employed, and anticipated outcomes for teachers and students. Further development studies might examine the extent to which each intervention achieves proximal outcomes (e.g., specific affective outcomes for educators or technical skills for students), perhaps based initially on published data. These studies would require concurrent examinations of implementation quality and fidelity, to ascertain the extent to which each model is being implemented as intended.

It is ultimately desirable to determine how effective the various interventions are, relative to one-another and/or to the absence of any intervention. Studies of this nature require quasi-experimental methods to manage other factors that might bear on outcomes, and will be complicated by the presence of techSteps—and potentially, other initiatives—in middle schools implementing Globaloria. These studies could be relatively expensive but might be manageable if examinations are based on school-level comparisons.

These types of study are very appropriate, if the aim is to establish policy, guidance, and support for Globaloria from the WVDE. However, the scope of these studies would be large enough to require substantial funding and cooperation of a range of entities at the state level, including designers of interventions, the WVDE, school districts, and a range of researchers.

How do factors such as moral purpose or understanding of the change process enable or inhibit scaling of the Globaloria model?

The Globaloria model actively addresses teachers’ and students’ affective outcomes, and the “Co-Learning, Peer-Learning, Self-Learning” framework emerging from the Year 1 pilot appears likely to strengthen the already-substantial social-learning aspects of the intervention, inherent to the technology and curriculum [3]. However, adoption of a *disruptive technology* like Globaloria might be limited by factors beyond the provision of resources and enhancement of individual teachers’ or students’ affective, cognitive, and behavioral development. For example, the Year 1 pilot recommendation that Globaloria be offered as a for-credit course might meet with school-level resistance grounded in complex cultural norms or beliefs.

Building-level ethnographic development studies attending to both individual and collective motivations, beliefs, and ownership of the innovation among staff members other than those directly involved in Globaloria would inform efforts to bring the intervention to scale. Similar study methods might be applied among Globaloria educators in an effort to understand the influence of *professional community, program coherence, and shared leadership* on their ability to activate the new skills and resources (as elements of *capacity*) afforded to them as part of the innovation [31].

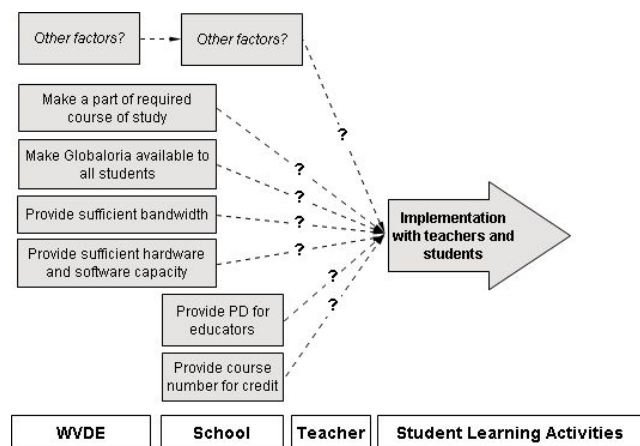
An understanding of these factors would be crucial in the presence of any district or WVDE mandate to implement Globaloria.

What other contextual factors might influence Globaloria implementation, and how?

In Year 1, Globaloria was offered as a for-credit course at Clay High School and as a not-for-credit club at Capital High School, but student metrics for both schools were similar. Pilot findings suggest further consideration of a number of factors including (a) integrated courses for grades and school credit, (b) scheduled time in session, and (c) implementation at “technical locations” [3]. However, what factors are embedded in those constructs? Is “technical location” a proxy for students having sorted themselves into a group oriented on the kind of learning activities and outcomes central to Globaloria?

Ongoing development studies might apply both qualitative (e.g., ethnographic) and quantitative methods such as multilevel modeling, to discover and understand other factors that influence school- and classroom-level implementation of Globaloria (see Figure 4). Interactions should also be considered, where sufficient data might be collected to ascertain them, and methods should consider the possibility that state- and district-level factors have a knock-on influence on other factors at lower organizational levels in the state education system.

Figure 4. Micro-Model of Factors Influencing Globaloria Implementation



Studies of this nature might be of a small enough scope to be implemented at individual Globaloria pilot sites, or across a range of settings in which the intervention is being applied. Findings from this type of research would likely be valuable to development of strategies intended to bring Globaloria to scale, or to translate it to new settings.

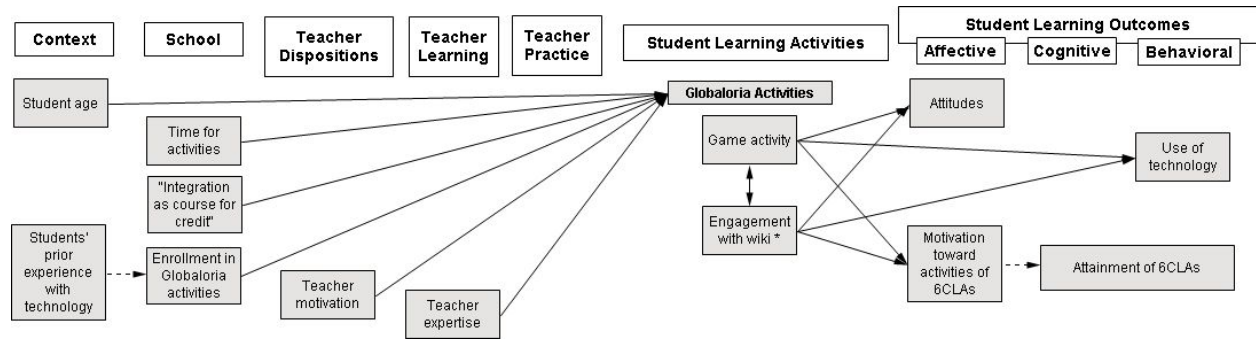
To what extent do schools, teachers, and/or students participating in the Globaloria-WV pilot represent the state population as a whole?

The Year 1 Pilot was implemented with “Eighty-nine students and eighteen educators from a few middle schools, a few high schools, one vocational high school, one community college, and one program for at-risk youth” [9]. Does this group actually represent “a variety of educator and student abilities, grades, backgrounds, socio-economic levels, and competencies in the area of technology?” [9].

Because students self-selected into the optional Globaloria activities (whether offered for-credit or in out-of-school-time settings), efforts to scale the implementation to a broader range of students might pose unanticipated challenges. It would be relatively simple using extant data to identify which students across the state are likely to respond to the Globaloria innovation in ways similar to those in the pilot, and what proportion of the student population this group represents. As the body of knowledge around Globaloria grows, it might be that researchers could ascertain more completely what factors are associated with—or are the best predictors of—successful student engagement in Globaloria learning activities (e.g., a student’s prior experience with technology, as illustrated in Figure 5 on the next page).

Linkages among a number of elements have been tentatively established (so in other words, small hypotheses are supported) by the Year 1 pilot, but (a) the influence of students’ prior experience with technology has not been firmly established, and (b) other influences might exist that have not been explored [23]. More advanced development studies should help Foundation staff examine and consider those influences, and develop practices and resources to effectively scaffold students who are less predisposed to success in the program.

Figure 5. Micro-Model of Findings of the WWF Globaloria Innovation Report 2



Findings from this type of study would be useful in translating questions about “Does Globaloria work?” into more useful but potentially complex discussions about “For whom does Globaloria work best?” and “How might educators best prepare students for success in the Globaloria intervention?”

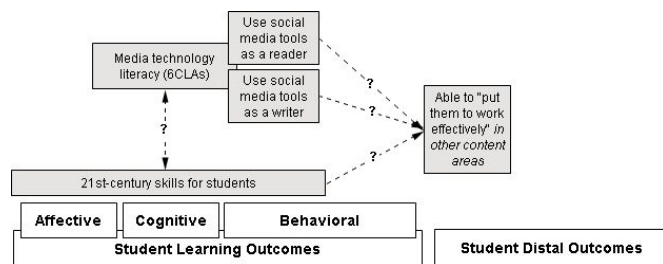
To what extent do evident student motivations toward activities associated with the 6CLAs transfer into the application of those other contemporary learning activities beyond Globaloria learning activities?

Figure 5 also illustrates another not-yet-supported hypothesis—that “motivation toward activities of the 6CLAs” leads to “attainment of 6CLAs” (or “media technology literacy”). This suggests the desirability of a study to examine how well students might apply those abilities to activities beyond those directly associated with Globaloria implementation.

A development or small-scale efficacy study (or series of studies) could easily extend the use of data-collection methods developed in the pilot to assess how students who have experienced the intervention engage those abilities in other content area learning, differently than students not exposed to Globaloria. Data collection strategies might include self- and/or teacher-reports of student behaviors relating to school work, rubric-based evaluation of attributes of student products from other classes, and assessments of proximal learning outcomes embedded in those products.

These studies might also reasonably examine students’ ability to apply 21st century skills more broadly to content area learning in their classrooms, as these skills seem to be complementary to the 6CLAs, and are similarly located in the logic of Globaloria (Figure 6).

Figure 6. Micro-Model of the Transfer of Media Technology Literacy and 21st Century Skills



Studies of this nature will prove to be crucial to establishing Globaloria’s impact on student content area learning activities—the way they undertake their coursework in English language arts, science, mathematics, social studies, and elective classes. These studies could be made at a number of

scales, from classroom-level action research studies by individual teachers (useful to informing local improvements in implementation), to comprehensive statewide studies applying common measures of students’ application of the 21st century skills and media technology literacy.

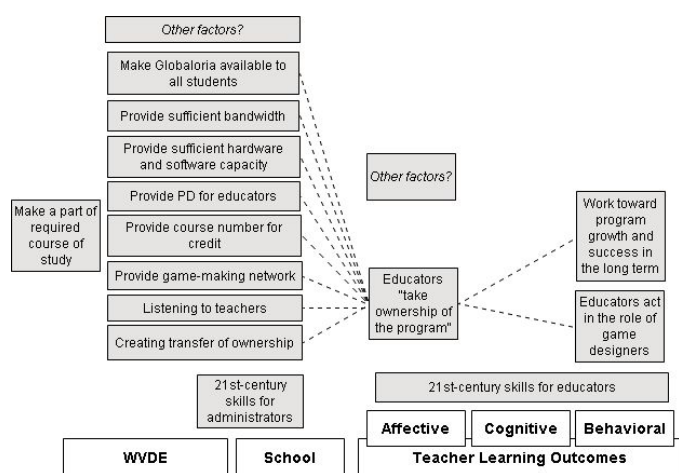
To what extent is students’ achievement of 21st century skills associated with student engagement in and achievement of the 6CLAs?

A related but slightly different type of development study might address the hypothesis illustrated by the vertical linkage in Figure 6 connecting “media technology literacy” (again, in terms of the Globaloria 6CLAs) and “21st century skills for students.” Descriptions in the documentary evidence vary as to whether the 6CLAs are a pathway to, or develop concurrent with, 21st century skills as they are defined by the Partnership for 21st Century Skills [21].

Additional clarity could be achieved by studies examining the potentially complex relationships among these sets of learnings for students. Again, this type of study might be implemented at any level of the state of West Virginia education system, where Globaloria is being implemented.

What factors bear on teachers’ motivations and expertise, relative to effective implementation of the Globaloria program?

Figure 7. Micro-Model of Factors Bearing on Teachers Motivation and Expertise



The Year 1 pilot report cited as a problem, the inclusion of educators and schools “lacking critical indicators for success” such as a *passion for investing time in improving their own technology skills, sufficient technological infrastructure in the school, or the opportunity to incorporate the intervention into the daily schedule as a formal course for grades and credit* [9]. In fact, a “more rigorous application process” was applied for the Year 2 Pilot participants (p. 7). This suggests that these conditions may more accurately be

thought of as *prerequisites to successful implementation*, so would need to be present in order to assure a reasonable likelihood of successful scaling. As the innovation comes to scale, it will likely become increasingly difficult to select which educators are responsible for the Globaloria content, and a broad mandate by the WVDE would make it effectively impossible to do so.

Recognizing this, researchers could apply methods similar to those described for assessing student factors that bear on success, to understand what teacher qualities enable—or inhibit—effective implementation of the program. Further development studies might establish how best to prepare educators to use Globaloria, and how to support them during implementation.

How does a face-to-face course- or club-based implementation of Globaloria compare with a purely virtual implementation?

To date, the Globaloria-WV pilot has been based on the assumption that students use a “domesticated” version of the innovation—one delivered in a physical space, applying a brick-and-mortar classroom paradigm. However, students at one site were unable to meet as a “course” in the spring of 2008, so continued using just the Globaloria social networking systems. This “free-range” implementation of the innovation is arguably more in line with first principles of the program, although might not “look like school” enough to be palatable to educators. Many social media technologies (e.g., MySpace, YouTube) are thought by educators to be artifacts of pop culture, with little or no educational value—even detrimental enough to learning that they may be blocked in schools, by policy [13, 19]. It might be useful to consider that students were once widely prohibited from using the Internet in schools—a position that is increasingly untenable—so it would be useful at this point in Globaloria’s development to study purely virtual examples of the intervention.

A comparative development study or small-scale efficacy evaluation research study, designed to examine aspects of implementation and proximal student outcomes, would be informative and have implications on efforts to scale the innovation. It would also be relatively simple and affordable, if a purely virtual cadre of educators and students can be organized, applying the existing data-collection strategies and analysis methods used during the pilot to date.

Understandings from this type of comparison will be invaluable to efforts to scale up Globaloria, and to help it achieve the ultimate vision described by its creators. Addressing this question should be a priority.

In what settings, and supported by what factors, do some out-of-school-time implementations of Globaloria seem to be of higher quality or more effective than others?

The Year 1 Pilot report determined that, where Globaloria was provided as an after-school activity, it “lacked the necessary time commitment, and conflicted with student attention to sports activities” [9]. Just like comparisons of face-to-face and virtual implementations of Globaloria, examinations of out-of-school-time examples of Globaloria might prove useful to Foundation staff as they work to improve the quality of this type of intervention. This has implications for efforts to replicate or scale the program to settings where organizational or other constraints prevent inclusion of the program in required curricula, where resources are scarce (e.g., salary for certified teachers), or in instances when it becomes desirable to provide enrichment or remediation of the targeted content with groups of students. Put differently, it may not be enough to say, “Globaloria should be provided as a required course.” Instead, it may become important to ascertain and share ways that districts and schools can improve the likelihood of successful implementation in settings where this just is not possible.

Development or small-scale efficacy studies of this nature could be implemented, with appropriate attention paid to attributes of implementation quality, to compare out-of-school-time implementations of Globaloria. This effort might start with a review of extant data from the pilot, perhaps complemented

by data from follow-up surveys or interview with students, to identify factors that require attention in order to mitigate challenges to quality implementation.

Initial studies of this type might be commenced quickly and with relatively little funding. It is a relatively simple thing to identify the conditions in which an education intervention seems to be most effective, but it is another entirely more challenging goal to understand factors that bear on implementation quality well enough to inform its use in less-than-perfect situations.

To what extent are some people more inclined than others to find social media technologies attractive, and what factors appear to influence this type of orientation?

The misalignment apparent in the Year 1 pilot finding that educators preferred telephone support to more readily scalable virtual communication poses interesting questions regarding the extent to which they are oriented on technology-enabled sources of information. Development studies applying perceptual data would be informative to ongoing improvement of the Globaloria curriculum, platform, and program; particularly in terms of understanding the extent to which these inclinations might be malleable enough to influence through professional development (for teachers) and learning activities for students. This question has substantial implications if in fact digital literacy is “the new reading and writing.” Some students struggle with writing activities from their earliest educational experiences but schools still work to teach them to write, so it is reasonable to infer that this would be the case with the use of social media technologies.

Studies addressing this question might rise to a very high level of methodology and instrumentation, addressing fundamental issues of cognition related to digital literacy. However, less complex, smaller scale (and less costly) studies could examine self-reported perceptual and observed behavior data from students or teachers using Globaloria, to begin to understand potential implications regarding the expectation that all students use social media technologies to gain digital literacy.

How do teaching and learning styles influence implementation of Globaloria?

Educators participating in the Globaloria pilot have received specific professional development to “develop technology and the Constructionist teaching skills” [9]. However, Purpose 5 of the Year 1 Pilot suggests that designers wanted to understand the extent to which the Globaloria platform and curriculum are “flexible and suitable for a diverse set of educators, student age groups and grade levels, *as well as styles of teaching and learning*” [9, emphasis added].

How important to successful implementation is it that student learning styles and teachers’ comfort with and understanding of constructionist approaches are consistent with those underlying Globaloria’s design? Put differently, is Globaloria an effective tool to achieve the desired student outcomes for students whose learning styles are not consistent with the intervention’s principle assumptions? For students in classrooms managed by teachers unfamiliar or uncomfortable with constructionist teaching orientation? Or is the question, “For which students or teachers is Globaloria effective, and why?” rather than, “Is Globaloria effective?”

The Year 1 pilot also identified potential challenges associated with the professional development afforded to participants, explaining that “Educator progress reports need to be better leveraged as tools for educators to focus their learning and teaching. Educators often wrote their reports quickly and saw them not as learning tools, but as one-off mechanisms for receiving their stipends” [9]. The potential conflict between “leveraging” the required progress reports and educators coming to see them as “learning tools” may be intractable, if teachers’ and professional development providers’ views of the purpose of the progress reports differ.

A range of classroom-level efficacy studies (again, attending to implementation quality), might target these and similar challenges, by examining in greater detail teachers’ affective, cognitive, and behavioral outcomes associated with Globaloria. These could be considered relative to teachers’ dispositions prior to their introduction to the intervention, to changes in dispositions and skills over time (e.g., their “motivation” and “expertise, per Figure 5), and even to antecedent conditions like previous professional experience and education.

It is anticipated that findings of these studies would be very useful to the parties responsible for providing professional development to educators who will be implementing the intervention— Globaloria-WV team members, the WVDE, district and school personnel. Luckily, initial studies of this type might commence immediately and at relatively little cost, beginning with data already collected and augmented by additional self-report data from participating educators.

What is an appropriate level of funding to support broader implementations of Globaloria?

Funding for Globaloria during the Year 1 Pilot was found to be insufficient [9]. It will eventually be necessary to determine what level of funding is appropriate, at various scales, to provide support likely to achieve quality site-level implementation and effectiveness of the Globaloria model. Cost considerations will have substantial bearing on future policy discussions regarding replication and scale-up of the intervention, so studies should be undertaken to document—or estimate—the actual costs of delivery, and to relate levels of expenditure to implementation quality and proximal outcomes.

Initial examples of these studies may be based in theory, in cost estimates and modeling, given the extent to which the Foundation is currently subsidizing the Globaloria-WV pilot: The costs required to implement (and study) the model might simply may not be known at this time, or they may not be reflective of real costs that will have to be borne by implementations in different settings, supported by other funding streams, and implemented at larger or smaller scales. Formal cost-benefit studies might be undertaken, considering as outcome measures attributes of implementation quality or proximal outcomes for teachers and/or students. Or less complex documentation processes might be applied to relate cost to other factors.

Studies of this nature might well complement the full range of implementations scheduled for the coming months and years, as some schools are implementing more than one Globaloria course for example. Absent formal cost-benefit study methods, cost data should be relatively simple to collect and analyze as a covariate to other measures.

What additional nonacademic outcomes result for students participating in Globaloria (e.g., changed attitudes toward school, plans for postsecondary education, ability to work effectively in teams)?

The distal outcomes for students inferred from the logic model, beyond those defined within the conceptual frame of Globaloria learning activities, are aligned generally along sociopolitical and economic lines. (See the Globaloria Distal Outcomes logic model, in the Appendix.) However, other nonacademic outcomes might exist for students that are commonly targeted by education interventions and may be embedded in “enhanced life and livelihood possibilities for participants.” For example, though not identified in the current logic models relating to Globaloria, students’ intentions for post-secondary education might be assessed through small-scale efficacy studies. Logic models may be criticized as limiting investigation to only elements and hypotheses that they identify, to the detriment of factors that might otherwise prove to be important.

A study based on open-ended inquiry with students experiencing Globaloria might identify outcomes—positive and negative—not anticipated by researchers, or surface other plausible explanations for those outcomes.

Does participation in Globaloria influence outcomes for some students differently than for others (e.g. those in suburban settings versus those in urban settings)?

Data for any study (or group of studies) might readily be analyzed to consider demographic factors. Even data collected during the pilot to date might be examined *post hoc* to ascertain different outcomes by urbanicity or other school-level factors, or by attributes of individual students. This additional examination of data might be applied to any of the studies proposed here.

How might Globaloria be expected to translate from an opt-in elective course or club activity, to a required curriculum expected to help “cultivate new contemporary learning abilities that provide students with a more clearly defined gateway into 21st -century learning?” [9].

A number of recommendations from the Year 1 pilot are intended to raise the stakes of Globaloria, including leveraging teaching and learning reports to “encourage teaching and learning directly among all educators;” establishing courses for credit to increase students’ “level of learning, participation, and achievement;” or even establishing a state mandate to implement the program [9].

Such policy recommendations should ultimately be based on substantial evidence of *efficacy*—the ability of the program to produce demonstrated effects—but this level of research has not to date been established in findings from the Globaloria-WV pilot. While this is an appropriate situation given the Foundation’s design-based research orientation and the newness of the Globaloria intervention, efficacy and impact studies must be part of future research. The model may be in a state of continual development but at some point it becomes necessary to demonstrate connections between its implementation and persistent, transferable outcomes for students.

Efficacy studies require experimental or quasi-experimental research models, which are neither easy nor inexpensive to undertake. Such studies may initially be small in scale, examining for example differential

outcomes in two classrooms in the same school. However, impact studies in larger implementations should be the ultimate priority of the research agenda arising from Edvantia’s study: Determining if research demonstrates sufficient evidence of effectiveness for the Globaloria platform, curriculum, and program as illustrated in West Virginia pilot implementation.

4.4 Social Media-Enabled Research: A Distributed Research Model

An interesting finding of the Year 1 pilot was that, “partnerships with local research institutions (Marshall University and West Virginia University) faltered somewhat during the year because of the open and creative nature of the project, which is not common at these universities” [9]. This paradox presents an interesting opportunity—applying the first principles underlying Globaloria, constructionism and social digital communications, to research into the model.

Collaborative examinations of real-world implementations of Globaloria could be activated in a distributed, democratic, pluralistic community, to undertake a range of studies of the large, complex problem defined by the master logic model that emerged from Edvantia’s study. Studies could range in level from development to impact (or even validation studies of data-collection instruments or protocols). Studies might also examine the broader issues related to the digital literacy content targeted by Globaloria, other models developed to support similar outcomes, 21st century learning in its broadest contexts, challenges present in the state of West Virginia, and implementation of initiatives intended to help West Virginia students become “successful 21st -Century citizens” [15].

To this end, Edvantia proposes the strategy applied by loosely affiliated groups of computer programmers, guided by a shared desire to create a system that accomplish the aims of commercial software products, but available in an open-source community. This is an example of a *distributed research and development model*, in which a large number of micro-efforts replace a monolithic, centralized research-and-development process. This type of distributed effort, complemented by a Globaloria-like design-based research orientation, might be readily applied to research questions related to Globaloria.

Broadly speaking, an effort of this type would engage a large number of diverse education researchers—practitioners, university professors, graduate and undergraduate students in related degree programs, even parents who home-school their children—each undertaking relatively small-scale study of the power Globaloria to achieve targeted outcomes. A graduate student or teacher-practitioner might target a single hypothesis illustrated by just one pair of elements in the master logic model, collecting data on each to determine the extent to which the semantic link between them might be supported. Findings of these studies would be shared within and beyond the community, to contribute to a growing knowledge base regarding not only efficacy, but also about factors influencing effect, interactions with other interventions, and qualitative understandings of implementation fidelity that are often lacking even in complex, expensive experimental or quasi-experimental studies.

This community of researchers could be connected using the same type of web-based social network for learning that drives Globaloria, to build an extensive body of knowledge around a dynamic, evolving research agenda. While an effort of this type might be grounded in the model that has emerged from

Edvantia’s study, logic models are living documents capable of adapting to changing understandings of theories-of-action as might result from ongoing research. For this reason, they can—and in fact should—evolve along with the research.

4.4.1. Broad Principles for Implementation. The proposed distributed research model moves forward only as it activates a community of researchers to support it. Whether a community can be created (or encouraged) is an open question at this time, but some first principles might guide substantive steps to enable such a community:

- A technology platform constructed around the “researching Globaloria” topical domain (similar to the MyGLife network) would be a necessary, but not sufficient, first step. The Foundation has demonstrated that open-source web applications can be adapted to support social learning networks.
- Members of the community must be motivated to participate. The most powerful motivators are likely to be intrinsic but external motivations might be applied to encourage participation. Researchers may see value in access to study participants, the provision of free resources (e.g., MyGLife network access for students), methodological support, instrumentation, or opportunities to publish, all of which could be negotiated through the community.
- The community must be free to exchange ideas and information about methodologies and findings. Limitations on the distribution of negative findings would corrupt the model and it must be accepted that news coming out of this type of effort may not always be good.
- It would likely be helpful if the effort were aligned with a nationally recognized organization, without commercial interests in research outcomes (e.g., the American Evaluation Association or American Educational Research Association).

4.4.2. Implementation Details. Details of implementation for a distributed research effort will ultimately be up to the community, as norms and priorities are established among members. However, it is interesting to imagine what functions might be furthered by collaborative research enabled by social media technologies—peer- and mentor-review of research designs and methodologies, management of a library of pertinent research literature, sharing of instruments, encouragement and support from fellow researchers, a even a clearinghouse for publication of findings and articles (potentially peer reviewed like the “old, slow media”) [14].

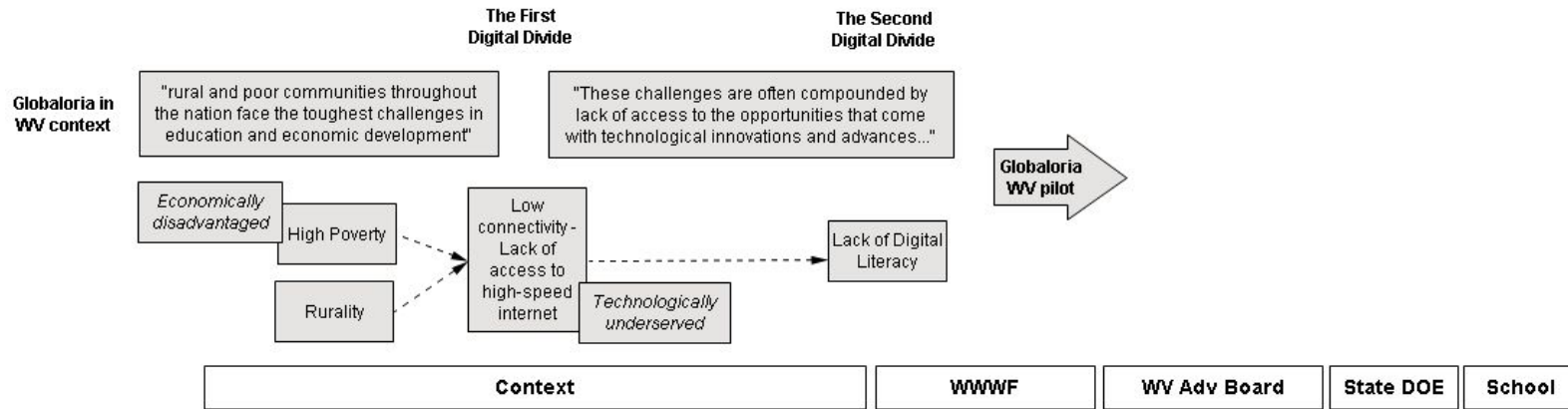
5. Conclusion: A Wealth of Research Opportunities

While the Foundation has put substantial effort into formative evaluation and design-based research of Globaloria, there clearly exists a broad range of interesting, pertinent research questions that have not yet been addressed by studies of the model as it has been piloted in West Virginia. A coordinated research effort including a spectrum of development and efficacy studies would be helpful to (a) inform ongoing improvement of the Globaloria platform, curriculum, and program; and (b) to guide efforts to scale up the intervention in West Virginia and beyond.

It is Edvantia's hope that the logic models and tentative research agenda resulting from its study will catalyze interest in further inquiry into Globaloria, among current stakeholders and even researchers not yet affiliated with the work. The Edvantia study is also intended to serve as the basis for ongoing collaborative efforts to pursue funding to support the proposed research, improve collective understanding of Globaloria, and inform its future use with students in, and beyond, the state of West Virginia.

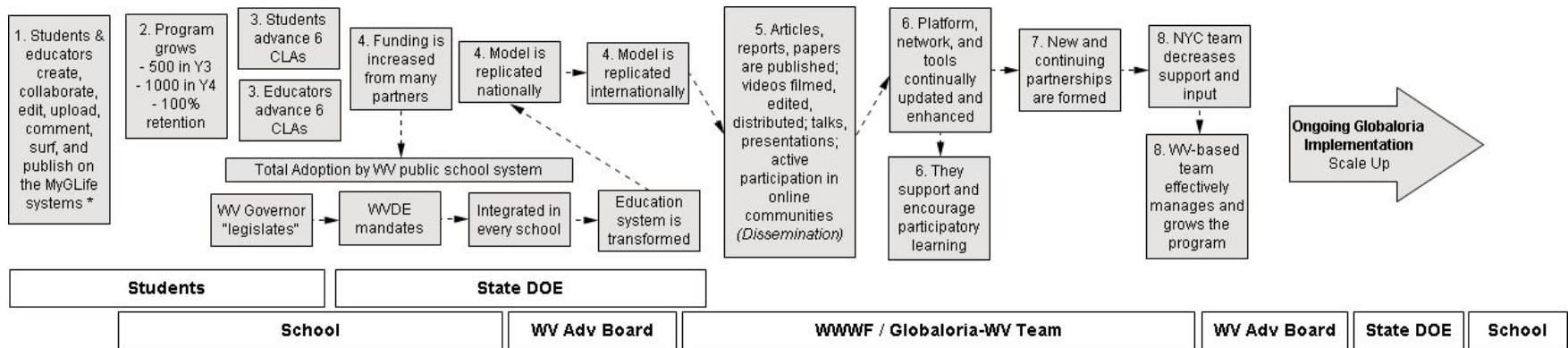
Appendix: Logic Models Relating to the Globaloria Program

Context for the Globaloria Intervention: The Two Digital Divides

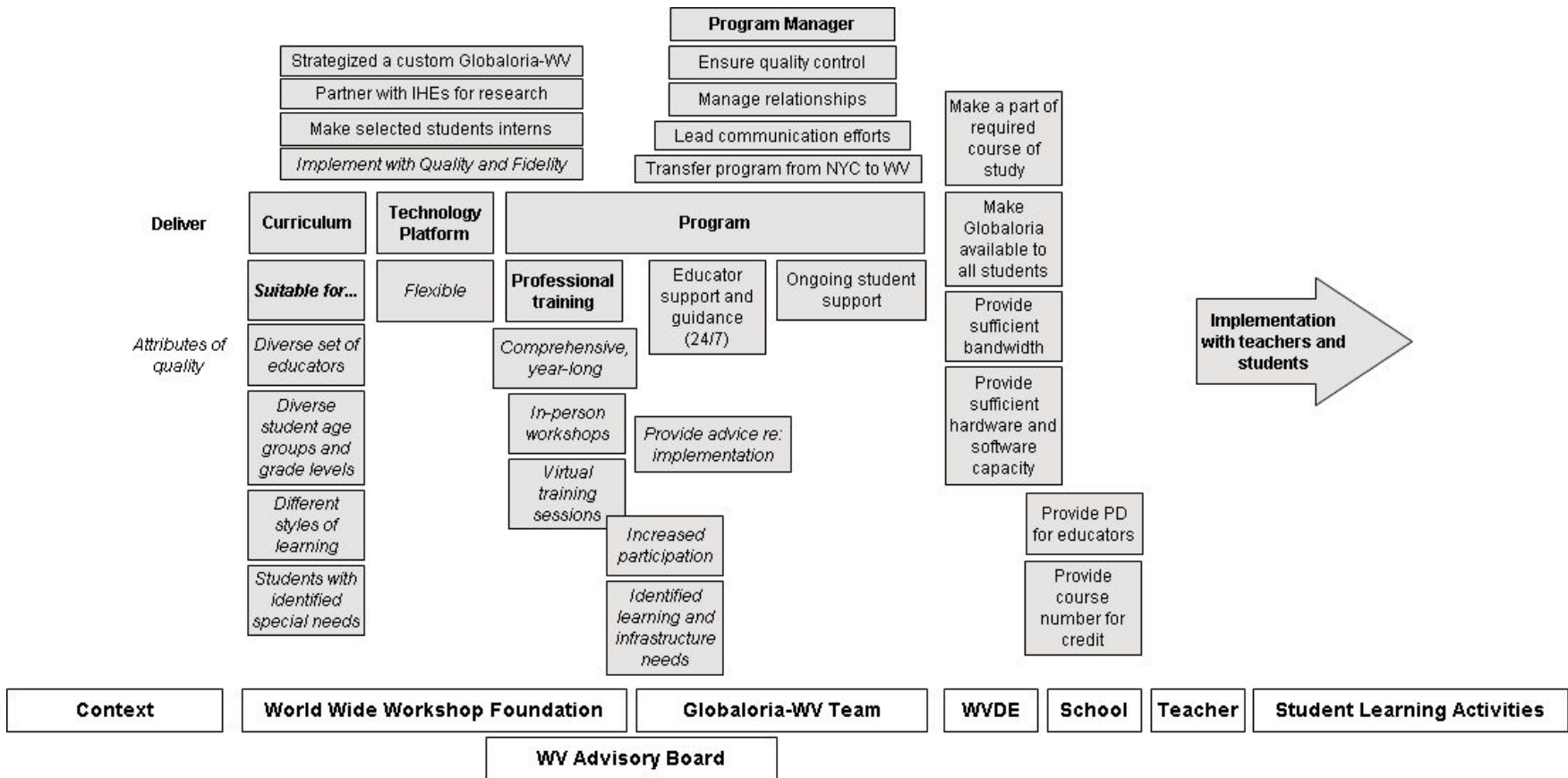


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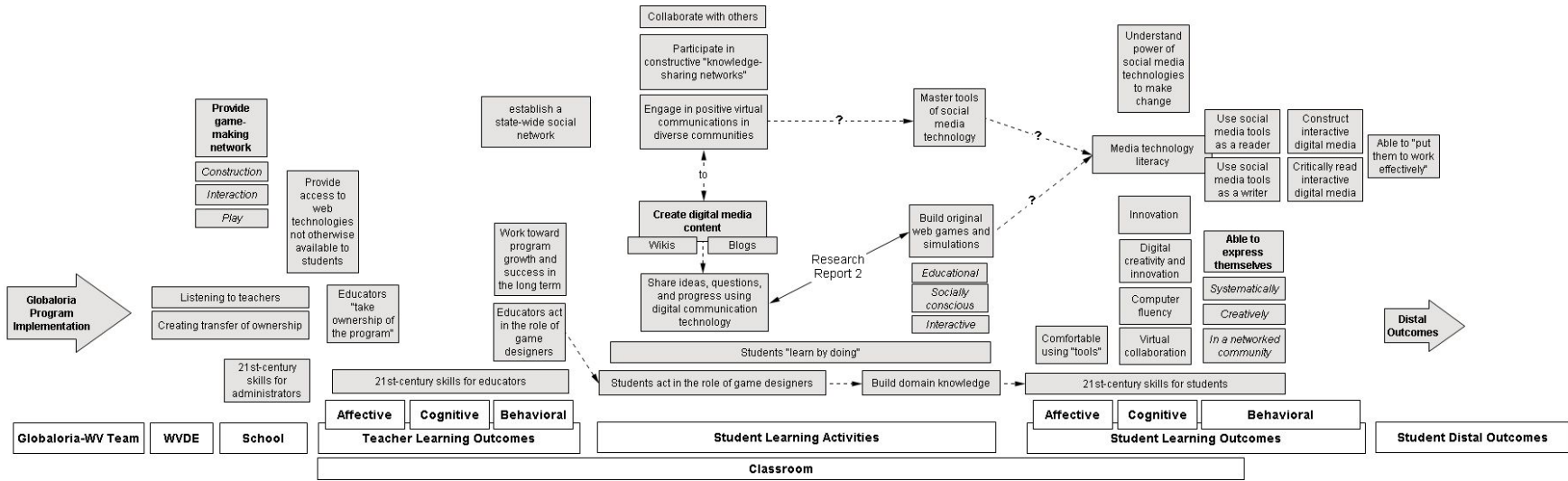
The Globaloria-WV Pilot Feedback Loop



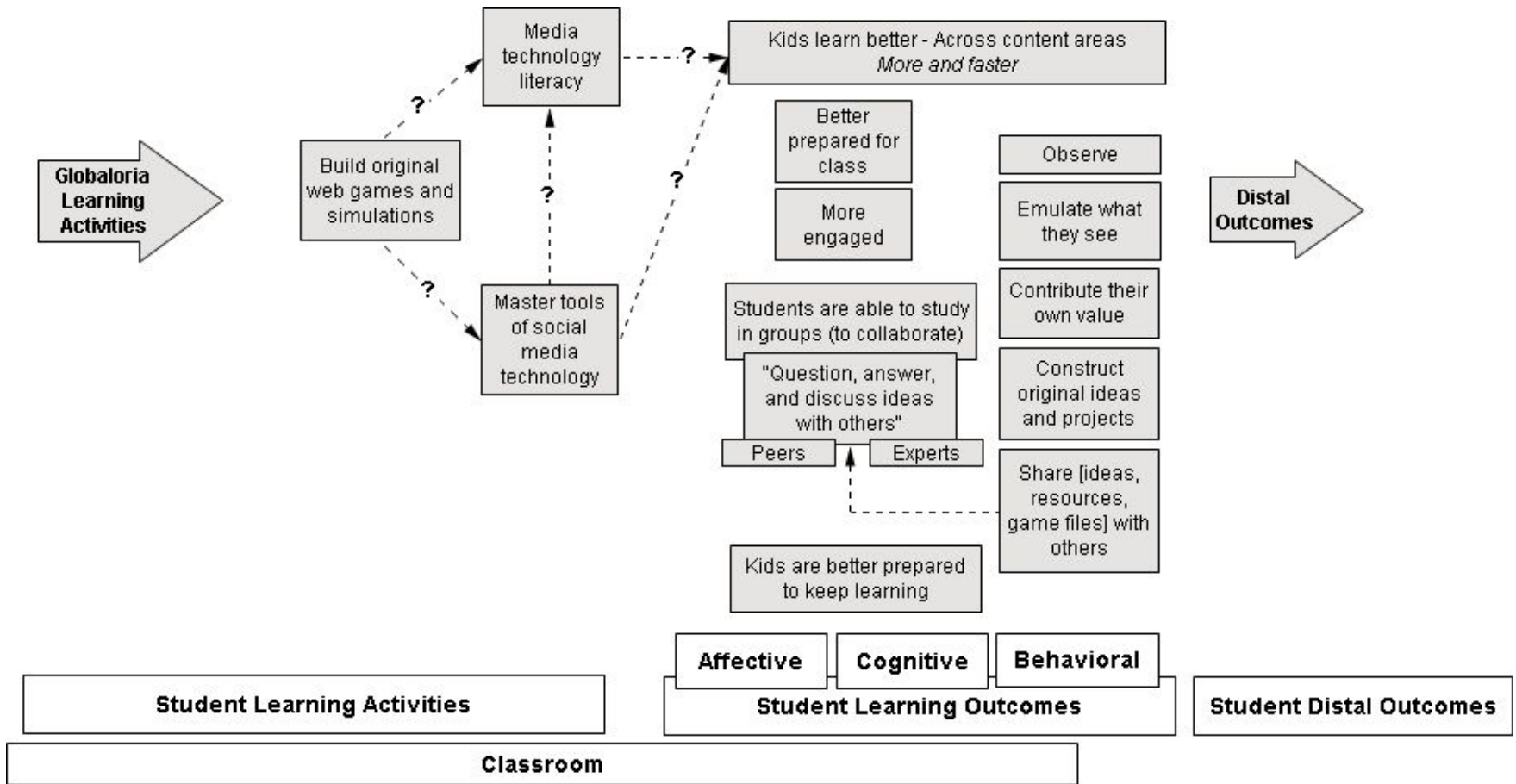
The Globaloria-WV Pilot Implementation



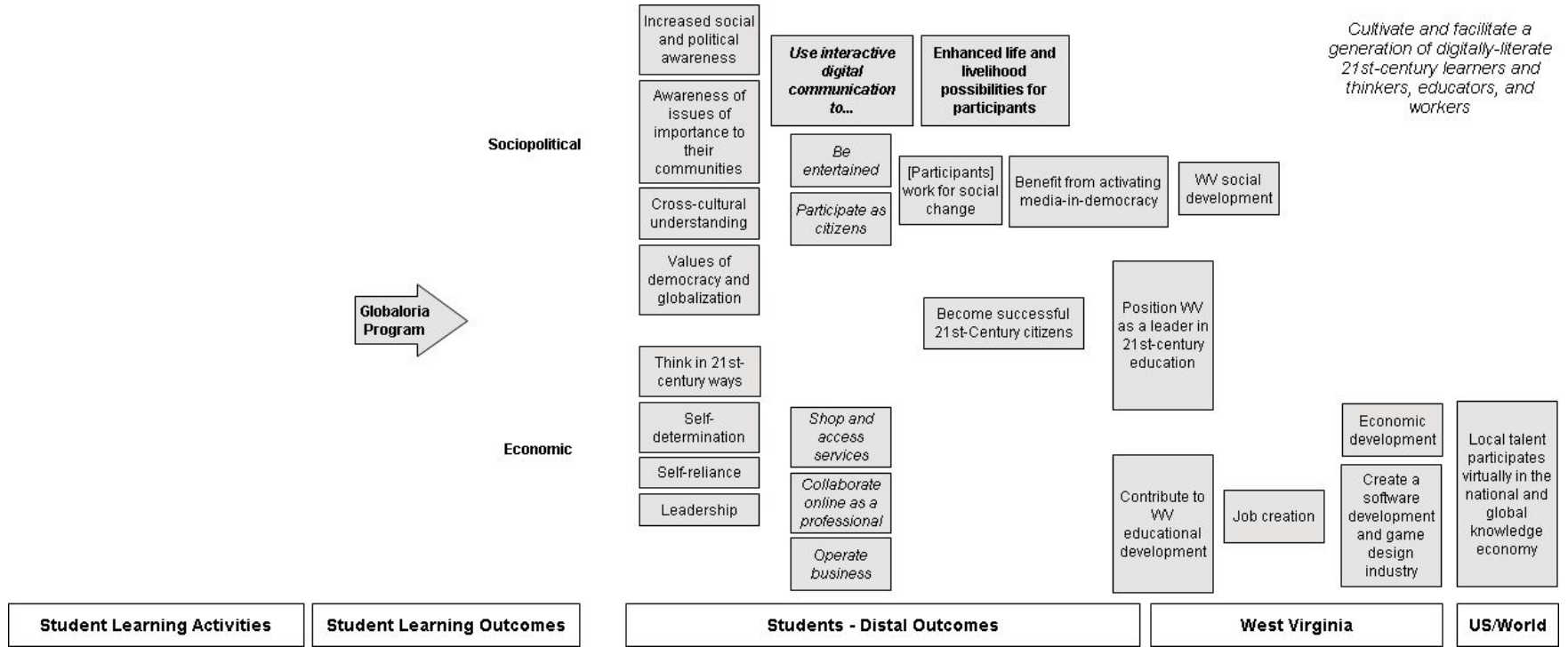
School-Level Globaloria Implementation and Learning Outcomes



Globaloria Impact on Student Content Area Learning



Globaloria Distal Outcomes



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