GLOBALORIA™

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The Results Are In: Globaloria Improves Teaching and Learning Across the Country

8 Highlights from the Globaloria Research Network:

Independent research is a core component of the World Wide Workshop's mission. The process of researching the impact of Globaloria on teaching and learning is an innovation in its own right. Since 2006, researchers from across the country conducted studies on an array of cognitive, developmental, social, instructional, systemic and cultural domains of knowledge. They have used a variety of methodologies, including controlled experimental designs, case studies, longitudinal studies and design-based research. These efforts inform the field of education reform and drive the enhancements of the Globaloria platform and its deployments nationwide in public schools, charter schools, after school programs, summer camps and community colleges and universities. As Globaloria continues to expand, the pool of data and possibility for education research expands with it.

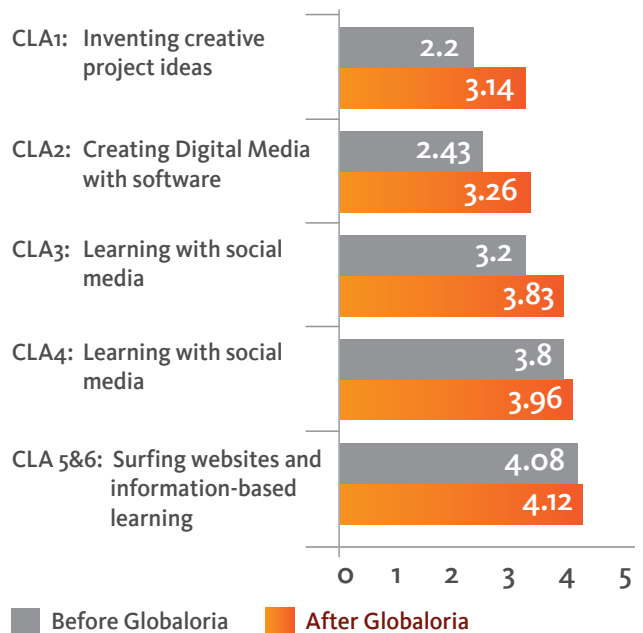> ## Globaloria helps students and educators build critical skills and habits of mind.
> 1. **Students report greater knowledge and motivation towards Contemporary Learning Abilities.**
> 2. **Globaloria creates the conditions for a shift toward self-directed and collaborative learning.**
> 3. **Teachers develop and implement new, transferable instructional styles and skills.**

1. The six dimensions of student practice and expertise used as Globaloria learning objectives, or "Contemporary Learning Abilities" (CLAs), are critical for effective participation in our knowledge economy and digital culture. Over five years of research, **Rebecca Reynolds of Rutgers University** found that *Globaloria consistently advances students' knowledge of and motivation toward all six CLAs,* particularly in the invention, progression and completion of an original digital project, in project-based learning with networked tools and in the publishing and distribution of self-created digital media artifacts (see Figure 1 for example items and a list of the 6 CLAs).

2. For many students, Globaloria is their first experience in which the teacher or instructor does not always have the answers, resulting in a shift towards self-directed learning. **Rockman et al**, quoted one student noting that as compared to traditional instruction, it is "very different when you go up to a teacher and they say 'I don't know, try this.'" Rockman found that as a result, *students work collaboratively to solve problems and expand their game-design skills on their own*, in some cases taking it upon themselves to go well beyond the curriculum requirements.

Figure 1: HS Students' Knowledge of Contemporary Learning Abilities

CLA		Before Globaloria	After Globaloria
CLA1:	Inventing creative project ideas	2.2	3.14
CLA2:	Creating Digital Media with software	2.43	3.26
CLA3:	Learning with social media	3.2	3.83
CLA4:	Learning with social media	3.8	3.96
CLA 5&6:	Surfing websites and information-based learning	4.08	4.12

◼ Before Globaloria   ◼ After Globaloria

3. Research conducted by **Pamela Whitehouse of West Virginia University** demonstrated the program's impact on teaching practices. Overall, educators believe they become better *teachers as a result of their participation in Globaloria.* They adapt their styles to reflect the Globaloria way of teaching and learning: self-led, collaborative, peer-to-peer and expert-guided. Most encouragingly, educators implement their new styles and used innovative learning tools, like blogging, in both Globaloria and non-Globaloria classes, demonstrating the transferability of these skills.

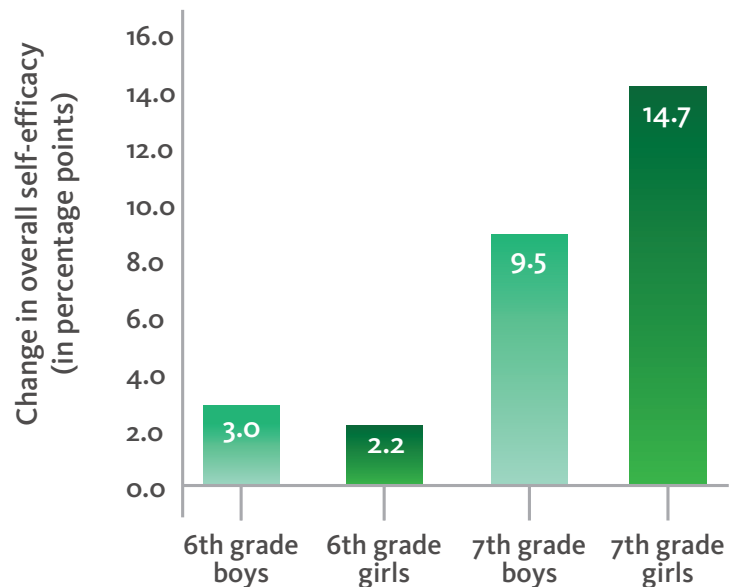## Globaloria boosts students'—particularly girls'—knowledge and use of technology.

4. Globaloria builds student interest in STEM careers and capacity to achieve in a technology-driven world.
5. Participation in Globaloria eliminates computer usage gaps among students, narrowing the digital divide.
6. Particular gains are found among girls, who enroll in Globaloria at a higher rate than the national average.

4. Laura Minnigerode, an Austin-based Program Evaluator who focuses specifically on low-income, minority English language learners, identified that *Globaloria participation boosts students' technology-learning self-efficacy,* skills like the ability to "put your thoughts and ideas into words that are easy for people to understand on your blog" and "search on the Internet to find help when you get stuck on something." The results shown in Figure 2 illustrate the magnitude of these gains and how they are compounded for 7th graders—and girls in particular—in their second year of Globaloria, attesting to the value of the multi-year practicum approach. This increase in skills corresponds to an increased interest in science, technology, engineering and math (STEM) careers, with *the number of students who hold a STEM-related career goal shown to rise from 36 to 52 percent for students in their second year of Globaloria.*

5. Alex Games of Michigan State University found that *Globaloria positively impacts students' Computational Thinking (CT) skills*, particularly in the problem decomposition and pattern recognition areas. Further research by Reynolds demonstrates the importance of these gains, finding that prior to participation, students with parents of above-average education reported increased home computer use, whereas *after participation in Globaloria, parent education no longer significantly determines student computer use.*

6. The strength of Globaloria as a program to engage and motivate girls in STEM learning is further underscored through research conducted by **Catherine Ashcraft and her team at the National Center for Women & Information Technology (NCWIT)** that found that *girls enroll in Globaloria computing coursework at a higher rate than the national average*, with 33 percent female enrollment in 2010-11 and 37 percent female enrollment in 2011-12. NCWIT researchers also found that Globaloria increases girls' participation in home computing activities such as making graphics, animation, games, digital music or video, programming and using online tutorials – an important achievement for an intensive computer science program.

Figure 2: Gains in Technology-Learning Self-Efficacy

Change in overall self-efficacy (in percentage points)

Category	Value
6th grade boys	3.0
6th grade girls	2.2
7th grade boys	9.5
7th grade girls	14.7

Globaloria boosts girls' interest in technology. Girls enroll in Globaloria computing coursework at a higher rate than the national average, with 33% female enrollment in 2010-11 and 37% in 2011-12. Globaloria participation increases girls' home computing activities, including making graphics, digital music, video, and using online tutorials.
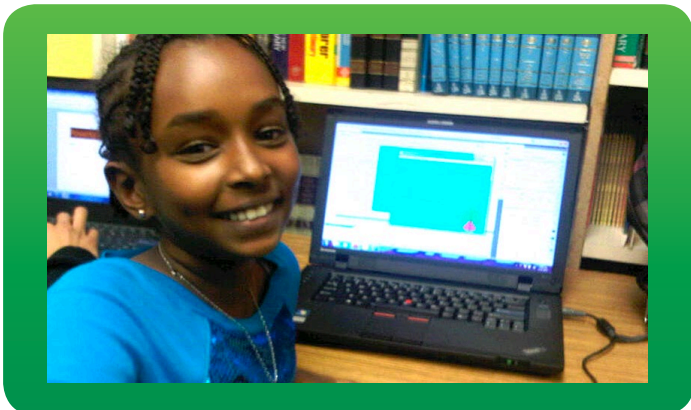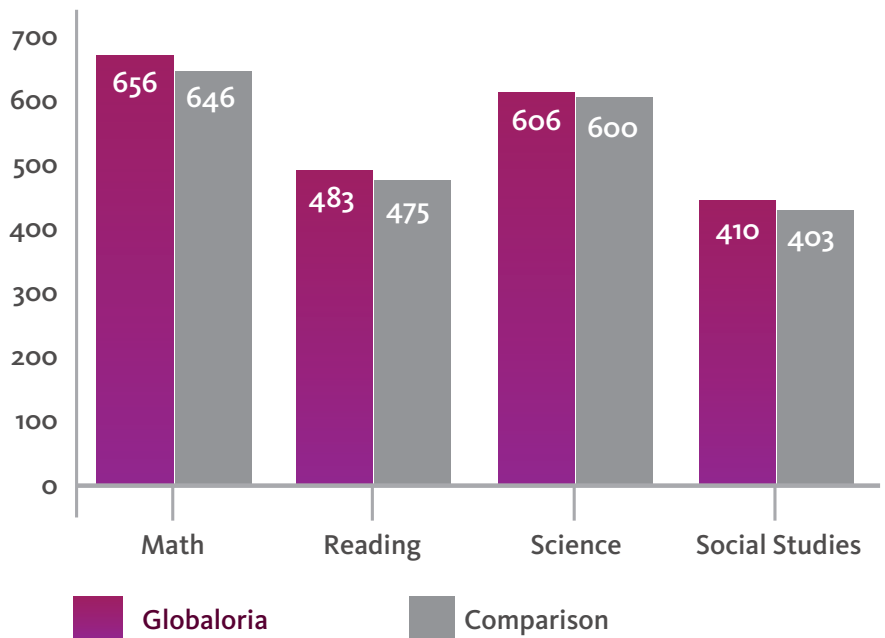
Globaloria is linked to significant gains on standardized tests of math and reading.

7. **Globaloria leads to increased performance on statewide assessments in West Virginia and Texas.**

8. **Significant gains are found among low-income students served by Globaloria programs in both states.**

7. In three consecutive studies, researchers at **Edvantia in Charleston, West Virginia**, found that Globaloria students – drawn from some of the most impoverished counties in the state – *outperform their peers on the West Virginia Educational Standards Test*. Most recently, researchers found that these gains were statistically significant on the Math and Reading subtests. A comparison of unmatched mean results on the WESTEST2 can be seen in Figure 3.

8. Similar gains were identified in Minnigerode's research among low-income middle-school students in Texas, where *6th graders' Globaloria final course grades are significantly correlated with performance* on math and reading objectives on the state TAKS tests.

Figure 3: WESTEST2 Results

Subject	Globaloria	Comparison
Math	656	646
Reading	483	475
Science	606	600
Social Studies	410	403

■ Globaloria   ■ Comparison

Globaloria increases students' academic performance. Students who participated in Globaloria scored significantly higher than non-Globaloria students on West Virginia's WESTEST2 in 2009 through 2011. Low-income, middle school students in Texas show statistically significant gains in critical reading, math achievement, and self-efficacy scores on standardized and unit tests.

Globaloria has a direct impact on students' computational thinking practices, particularly in problem decomposition and pattern recognition. Participation in Globaloria eliminates disparities in home computer use among students on the basis of parent education.

Globaloria: Increasing Academic Performance & Bridging Digital Divides
Summary of research results from 2007–2012 studying over 7000 Globaloria students and 500 educators in 7 states across the nation

Globaloria increases students' academic performance
- Students who participate in Globaloria score significantly higher than non-Globaloria students on West Virginia's WESTEST2 year after year (2009 through 2011)
- Globaloria students who use the network as part of a core curriculum class—for example, biology—score moderately higher than their non-Globaloria peers on five out of six academic assessment measures: three unit tests, course average, and course grade
- Low-income, middle school students in Texas show statistically significant gains in critical reading, math achievement, and self-efficacy scores on standardized and unit tests

(Dr. Doris Redfield & Dr. Kristine Chadwick, Edvantia, WV; Dr. Bobbi Nicholson, Marshall University, WV; Laura Minnigerode, World Wide Workshop, TX)

Globaloria helps underserved students overcome digital barriers
- Globaloria helps students significantly increase their ability level in the three most Constructionist contemporary learning abilities, indicating mastery of digital literacy
- Globaloria has a direct impact on students' computational thinking practices, particularly in problem decomposition and pattern recognition
- Participation in Globaloria eliminates disparities in home computer use among students on the basis of parent education

 (Dr. Alex Games, Michigan State University & Dr. Rebecca Reynolds, Rutgers University, NJ)

Globaloria boosts girls' interest in technology
- Girls enroll in elective Globaloria coursework at a higher rate than the national average, with 33 percent female enrollment in 2010-11 and 37 percent female enrollment in 2011-12
- Globaloria participation increases girls' participation in home computing activities, including making graphics, animation, games, digital music or video, programming and using online tutorials

(Dr. Zhen Wu, Dr. Catherine Ashcraft & Dr. Wendy DuBow, National Center for Women & IT at the University of Colorado & Dr. Rebecca Reynolds, Rutgers University, NJ)

Globaloria improves learning habits and behaviors
- Globaloria effectively promotes collaborative learning, with greater numbers of students working in teams; for example, 73 percent of all games are created collaboratively
- Globaloria students are developing new and expanded skills, including problem-solving, organizational and time management abilities, presentation, interpersonal skills, and collaborative processes
- Globaloria inspires students to consider STEM careers, increasing the number who identify STEM-related career goals from 36 to 52 percent of students in their second year of the program
- Researching, planning and designing games relating to civic topics using the Globaloria curriculum results in a more meaningful and lasting civically-minded connection than through traditional curricula

(Dr. Bobbi Nicholson, Marshall University, WV; Dr. Rebecca Reynolds, Rutgers University, NJ; Jennifer Borland, Rockman et al & Laura Minnigerode, World Wide Workshop, TX)

Globaloria transforms teaching styles
- Overall, teachers believe they are better teachers as result of their participation in Globaloria
- Globaloria educators significantly change their styles to reflect the Globaloria way of teaching and learning: self-led learning, co-learning, peer-to-peer learning, expert-guided learning
- Globaloria educators develop their own digital literacy in ways that have far-reaching effects on their teaching decisions, attitudes towards students, and the habits of mind they are developing vis-à-vis their own practice
- Globaloria educators implement their changed teaching styles in both Globaloria and non-Globaloria classes, demonstrating the viral character of their new skills

 (Dr. Pamela Whitehouse, WVU)

Find out more at WorldWideWorkshop.org/reports

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