

## **Globaloria: Advancing STEM and 21<sup>st</sup>-Century Teaching and Learning Selected Research Findings from the Globaloria Network of Researchers**

### ***Increased academic performance***

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

- Students who participate in Globaloria score significantly higher than non-Globaloria students on West Virginia's WESTEST2 science subtests year after year (2009 and 2010)
- 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

### ***Advanced digital literacy***

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

- Globaloria helps students significantly increase their ability level in the three most Constructionist contemporary learning abilities, indicating mastery of digital literacy:
  - Invent, program, complete an original web game, wiki, or simulation
  - Manage complex, project-based learning in the Web2.0 environment
  - Produce, program, publish, and distribute interactive digital media in social networks
- Through Globaloria, students become more engaged, active and effective wiki participants and bloggers
- Globaloria has a direct impact on students' computational thinking practices

### ***Improved learning habits/behaviors***

(Dr. Bobbi Nicholson, Marshall University, WV; Dr. Rebecca Reynolds, Rutgers University, NJ; Laura Minnigerode, World Wide Workshop, TX)

- Globaloria effectively promotes collaborative learning, with greater numbers of students working in teams—i.e., 73 percent of all games are created collaboratively
- Globaloria students are developing new and expanding skills, including problem-solving, organizational and time management abilities, presentation, interpersonal skills, and collaborative processes
- Globaloria inspires girls to engage in and master technology and to consider STEM careers
- 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

### ***Transformed Teaching style/teacher professional development***

(Dr. Pamela Whitehouse, WVU)

- Overall, teachers believed 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 (transfer of skills developed through Globaloria, for example using blogging in their other classes)
- The Globaloria online learning network promotes democratic and collaborative educator learning that informs the individual educator at his/her own pace
- Teachers found the shift from didactic to facilitated learning the greatest challenge; but were highly impressed with the learning achieved as a result of the shift