GOODMAN RESEARCH GROUP, INC.
Program Evaluation • Consultation • Market Research

The BioBridge Professional Development Model: Year 3 Annual Report

Executive Summary

PREPARED BY
Goodman Research Group, Inc.

SUBMITTED TO
UCSD BioBridge Program

November 2011
Revised December 2011

EXECUTIVE SUMMARY

In 2008, the University of California, San Diego (UCSD) and three K-12 partners – Sweetwater Union High School District, San Diego Unified High School District, and Oceanside Unified High School District – received a grant from the U.S. Department of Education to fully develop the BioBridge Teacher Professional Development model, previously piloted in a limited number of Sweetwater schools. The four-phase BioBridge PD program aimed to increase teachers' understandings of evolving science, their comfort levels while implementing various new content-based lab activities into existing curricula and ongoing instructional activities, and their appreciation of progressive scientific research as applicable to producing increases in student motivation and learning.

UCSD contracted with Goodman Research Group, Inc. (GRG) to conduct the external evaluation of the BioBridge PD program. The primary objective of the evaluation was to inform the continuous refinement of the model by answering the following questions:

1. What is the BioBridge standard for professional development, and how can each Phase of the BioBridge PD model be refined to meet that standard?
2. To what extent is the BioBridge model effective across different Content-based activity areas?
3. To what extent is the BioBridge model effective at training teachers who are new to the model?
4. Does the BioBridge model lead to positive changes in teachers' perceived content knowledge, their comfort using leading-edge science in the classroom, and their appreciation of emerging science overall?
5. Does the BioBridge model lead to positive changes in students' science knowledge and interest?

GRG collected data from teachers before the program (N=149), after training (N=250), and after implementations (N=232). In addition, GRG collected data from students after training (N=599) and after implementations (N=209). Finally, GRG's team of California-based field researchers conducted observations of training (N=24) and implementations (N=158).

KEY FINDINGS

Some of the BioBridge standards for professional development were achieved in their entirety. Others were partially met.

Phase I/II teacher ratings achieved the BioBridge standard of 4 out of 5 or higher. Phase I/II training and materials were of high quality, teachers' implementations during the training were very successful, and the UCSD mentors were very helpful. Teachers were invested in the BioBridge model as a way for them to develop professionally and as a way to achieve positive science outcomes for their students.

Phase IV teacher ratings also primarily achieved the BioBridge standard of 4 out of 5 or higher, indicating teachers' favorable early impressions of the activities held up through the implementation period. Teachers' average rating of the success of their implementations, while slightly lower than other ratings, was nevertheless at the threshold of very effective.

The BioBridge activity implementation rate was moderate to high. Nearly three quarters of teachers who attended Transformation trainings during the project period had implemented the activity in their classrooms by the end of the project and the implementation rates for the Enzymes, Protein Purification, and Ocean Acidification were between 50% and 60%.

The project did not achieve its goal of 75% of teachers implementing at or above the fidelity threshold. Each year, slightly more than half of the teachers met fidelity. The standards that were the primary obstacles to fidelity were teachers talking about the practical applications of the lab as part of the lab wrap-up and the use of Student Leaders during implementation. It is important to note that the percentage of classroom implementations that met the former criterion increased from 28% in year 2 to 47% in year 3, so there was progress in this area.

The project also fell short of its ambitious goal of 90% of teachers reporting increased knowledge and comfort after training and after implementation; however, the gains that were achieved were statistically significant. These included increased knowledge of and comfort with BioBridge science content and pedagogical techniques as well as increased comfort with BioBridge materials and protocols.

The BioBridge PD model's fundamental template is adaptable across a range of science subject areas and is as effective with teachers new to the model as it is with teachers who had previous experience with the model.

Teachers' ratings of the quality of training, the quality of activities, the success of their implementations, and the likely effect of the lessons were consistent across BioBridge activities and between new and seasoned teachers and generally met the BioBridge standard of ratings of 4 or above on 5-point scales. In addition, an increase (of any size) in teachers' knowledge and comfort was consistent across content-based activities and new and seasoned teachers. A notable difference between new and seasoned teachers, after implementation, was a higher percentage of new teachers reported an increase in their comfort with the BioBridge protocols than did tenured teachers.

The BioBridge PD model increases teachers' perceived science knowledge and comfort.

Teachers reported higher levels of knowledge about BioBridge science content and pedagogical techniques after training. Teachers also reported the added value of the practice session in terms of increasing teachers' comfort with science content, pedagogy, materials, and protocols. These results held up through implementation. In addition, the professional development experience increased teachers' appreciation for the cutting-edge science featured in BioBridge activities.

There is some evidence that the BioBridge model has the potential to increase students' science knowledge and interest.
Nearly all students reported they learned new science concepts during the BioBridge training. Teachers believed the labs would have a moderate effect on their classroom students' understanding, confidence and interest in science. Teachers also reported that the BioBridge labs would support the students in inquiry based learning. Moreover, end of course test results strongly suggest that student exposure to BioBridge activities accounts for improved student outcomes.

Taken together, these data suggest that the BioBridge professional development contributes greatly to quality classroom implementation of the BioBridge labs. Staff developers who facilitate continuing professional development of middle school science teachers, faculty working at colleges and universities who prepare science teachers, and school administrators and leaders of county offices of education who make decisions about the programs available for their science teachers' ongoing learning are likely to benefit from what was learned in this project. In expanding or replicating the model, the team should revisit and refine fidelity standards to verify that all criteria are relevant, explore refinements to Phase I/II trainings to ensure the standards are as explicit as possible, and consider staff member presence at new lab implementations when making decisions about how to staff the project. The recommended next step in terms evaluation is a cluster randomized trial (cRCT) to rule out threats to inference that could not be fully addressed in this evaluation.

Goodman Research Group, Inc.

Main Office
955 Massachusetts Avenue, Suite 201
Cambridge, Massachusetts 02139

Tel: (617) 491-7033
Fax: (617) 864-2399

info@grginc.com
www.grginc.com

© 2011 Goodman Research Group, Inc.