Since 1992, Dr. Hankes, the CMAG Project Primary Investigator, has provided Cognitively Guided Instruction (CGI) workshops throughout the US, working primarily with districts serving Native American communities. CGI is an inquiry approach to teaching elementary level mathematics that was developed by Dr. Thomas Carpenter and Dr. Elizabeth Fennema at the Wisconsin Center for Education (Madison). CGI is one of the few professional development approaches for teaching mathematics that the US Department of Education recommends and acknowledges as being scientifically based.

In 2007, Dr. Judith Hankes was asked by the administrators of a large South Dakota district to conduct an investigation to determine why, after four years of district-wide extensive CGI teacher training, the high-stakes inquiry-based state test indicated that the mathematics achievement of Native students had not improved compared to the significant improvement of non-Native students. Concern was expressed over the fact that the mathematics achievement gap between white and Native students had widened following the CGI training.

Investigation into the matter documented that a disproportional number of Native students district-wide were identified as learning disabled (LD) and that these students received mathematics instruction in pull-out special education classrooms rather than regular education classrooms. The investigation also determined that only regular education teachers had been encouraged to participate in the CGI workshops. Justification for not including special education teachers was the belief that students identified as LD learned best through direct instruction rather than inquiry.

However, an important fact had not been considered when determining whether to include special education teachers in the CGI workshops. This was that, prior to the 2002 NCLB mandate, students identified as LD had been exempted from state testing, but after the passage of NCLB, testing of all students was required. An alternative assessment was developed for students with severe cognitive disabilities (CD). However, students identified as LD were required to take the inquiry-based state test, since LD students possess average or better
intelligence. This requirement was based on the analysis of national student achievement data documenting that disproportionate numbers of exempted students were from disadvantaged populations, primarily children of poverty. This finding suggested over-identification of special education students.

Returning to the South Dakota school district problem, the state mathematics achievement test revealed that regular education students whose teachers had participated in CGI workshops and taught problem solving through inquiry demonstrated significant learning gains. However, because the Native student scores showed no gains, the achievement gap between Native and white students widened. Was it possible that this widening of the gap was because the mathematics instruction of a disproportionate number of Native students identified as LD had not prepared them to write an inquiry-based test? These findings and this question prompted the CMAG Project, since like South Dakota, a disproportionate number of Wisconsin Native American students are identified as LD.

In 2008, state funding was awarded to a team of UW Oshkosh professors to conduct a 3 year study to investigate whether preparing special education teachers of serving Native communities to teach mathematics through inquiry, Cognitively Guided Instruction, would result in significant achievement gains of Native students on the Wisconsin Knowledge and Concept Exam. Thirty-four teachers from eight school districts participated: Bayfield, Bowler, Crandon, Lac du Flambeau, La Courte Orielles, Menominee Indian, Waubeno, and Winter. Finding of the study documented no only significant achievement gains of target students as well as the increased content and pedagogical knowledge of the teachers. However, the CMAG Project investigators agree that the most compelling findings of the study were what special education teachers reported about how their students have changed.

1. They are coming up with a solution that makes sense to them, and this makes them feel good.
2. There is not somebody saying, “That is not right. Do it this way”. So they are feeling better about themselves.
3. It’s not a matter of them seeing that they get F’s on their paper or their work is marked wrong. They just explore, and they have fun doing it.
4. They love story problems and graphing.
5. They have been given permission to use their own thinking;
6. The students are learning from each other; and
7. They actually understand what they are doing and can explain it!”
8. I see the kids enjoying math more, so much more. They love it.

Three years of continued state funding has been awarded for the replication of the 3 year CMAG Project in CESA 12 beginning Fall 2011. Participating districts in the new study will be Ashland, Bayfield, Washburn, and Hayward. At this point, one year of funding has been guaranteed, but in today’s tight fiscal climate, there is no assurance of continued funding for study Years II and III. However, project directors are confident that a great deal can be accomplished in one year.

In closing, it is important to acknowledge that in Wisconsin disproportionate numbers of disadvantaged children from all culture groups identified as LD fail to achieve academic success. However, this problem is not unique to Wisconsin, it is a problem facing the nation. This is a problem that impacts the self-sufficiency of large numbers of future citizens, since success in today’s society requires mathematical competence. However, empowering teachers to empower students is more than an economic-driven initiative. When failure results in underdeveloped potential, learned helplessness, and discouragement, empowering teachers to empower students with mathematical competence becomes a sacred mission. Efforts of the CMAG Project to embrace this mission have proven to be positive.

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