## What is this research about?
This research investigates the effects of a focused professional development (PD) program on teachers’ beliefs about their effectiveness at applying standards-based mathematics curriculum in Grade 6.

Three specific research questions, guided the study:

1. *Will the PD increase teacher-efficacy beliefs about teachers’ ability to engage students?*

2. *Will the PD increase teacher-efficacy beliefs about teachers’ ability to implement appropriate teaching strategies?*

3. *Will the PD increase teacher-efficacy beliefs about teachers’ ability to manage students?*

## What did the researchers do?
Bruce et al (2010) conducted a randomized field trial experimental study with 106 Grade 6 teachers in an Ontario school district. A treatment and a control group were created and all Grade 6 teachers in each school within the district were randomly assigned to these groups for investigation.

The researchers designed 12 survey items for teacher efficacy on a 5-point Likert scale with responses ranging from “nothing (1)” to “a great deal (5).” The Teachers’ Sense of Efficacy scale was administered to the treatment and control groups 2 weeks before (pre-test) and after (post-test) the final PD sessions.

The treatment group received the first treatment during September-December of 2003, while teachers of the control group maintained their daily routines and programs. After the post-test.

## What you need to know:
Professional development in Mathematics for a group of Grade 6 Math teachers increased these teachers’ confidence in managing their math classrooms.
administration with the treatment group, the control group was offered the same PD.

The adapted Teachers’ Sense of Efficacy scale includes:

- 4 items representing efficacy for engagement (for example, “How much can you do to motivate students who show low interest in mathematics?”)
- 4 items representing efficacy for teaching strategies (for example, “How well can you implement alternative mathematics strategies”);
- 4 items representing for efficacy for student management (for example, “How much can you do to calm a student who is disruptive or noisy during mathematics?”).

The researchers measured standards-based mathematics teaching using 20 items (for example, “I regularly have my students work through real-life math problems that are of interest to them”). In addition to these measures, the researchers also designed 2 teacher background measures: 1) previous training in mathematics, and 2) professional development in teaching mathematics.

The PD developed for this study was structured in a full day session proceeded by three 2-hour after school sessions. Within each of the sessions, standards-based mathematics teaching strategies were modeled for teachers and then teachers were engaged in an interactive math session that used Grade 6 curriculum tasks to build math knowledge.

Following each session, teachers were then asked to implement the learnings from this PD session into their own math classrooms, collect evidence of student thinking, and share their classroom experiences with other teachers who had participated in the PD sessions.

According to the researchers, the PD targeted and added knowledge to Bandura’s four sources of efficacy information (mastery experience, vicarious experience, social persuasion, and physiological and affective states).

The researchers calculated the means, standard deviations and reliabilities of all variables. T-tests of the groups on pre-
test variables were also conducted as well as exploratory factor analysis on the teacher-efficacy items.

In conducting a multivariate analysis of covariance, the researchers represented the post-test scores on the three teacher-efficacy variables as the dependent variable, the pretest scores as the covariates, and the experimental condition as the independent variable.

Finally, a univariate analysis of covariance was conducted with similar variables as the multivariate but having three dependent variables: attendance at a minimum of one mathematics conference, experimental condition, and interaction of condition and covariate.

What did the researchers find?
The researchers found that:

- teachers that participated in the mathematics PD reported greater confidence in their ability to manage mathematics classrooms than did teachers who did not receive the mathematics PD;

- the PD program had a positive influence on teacher expectations about their ability to handle student management issues in mathematics classrooms;

- of all the measures on the Teacher’s Sense of Efficacy Scale, only the changes in classroom management were statistically significant (5.7% of the total variance). Based on this finding, the researchers hypothesized that a teacher’s ability to engage students and use innovative and relevant teaching strategies may only come after teachers have gained confidence in handling classroom management issues.

How can you use this research?
This research outlines strategies on how to enhance opportunities for teachers’ self efficacy and provides directions for PD programs that target the sources of self-efficacy with the likelihood of increasing teachers’ level of confidence.

About the researcher
Dr. John A. Ross is Professor Emeritus of Curriculum, Teaching and Learning at the Ontario Institute for Studies in Education at the University of Toronto and head of the Institute’s field centre in Peterborough, Ontario. His research interests are mathematics education, student assessment and program evaluation.

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References

Key Words
Mathematics education, professional development, teacher efficacy, teacher learning

About this summary
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