

Principals Want to Know

A tip sheet for principals that focuses on practical issues faced in schools.

Drawn from existing resources, these tips are designed to support instructional leadership practice.

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Math CLIPS

The Question:

What are the benefits of including CLIPS in my School Improvement Plan for grades 4-12?

The Answer:

CLIPS (Critical Learning Instructional Paths Supports) can improve teaching and learning of mathematics. They are interactive, web-based learning sequences focused on challenging-to-teach-and-learn curriculum expectations in math. CLIPS use requires principal support relating to:

1. Setting goals
2. Aligning computer and SMARTboard resources
3. Establishing a collaborative mathematics learning culture
4. Using data
5. Engaging in courageous mathematical conversations

1. SETTING GOALS

CLIPS use can close achievement gaps. CLIPS clusters have been developed to address topics that EQAO testing, teacher and district assessment programs, commercial assessment packages (e.g., the Ontario Numeracy Assessment Package [ONAP]) and research studies identified as persistent challenges in mastering math expectations. CLIPS topics include fractions, integers, linear growing patterns, and periodic and sine functions.

When considering using CLIPS, refer to the following research recommendations:

- Teachers should strongly consider using CLIPS in conjunction (and integrated) with classroom instruction focused on the same concepts. For example, teachers can use the CLIPS tasks for demonstrations as springboards to engage students in mathematics discourse, during activation and consolidation phases of the three-part lesson.
- Teachers need to consider how to establish cooperative norms when students are using technology as a learning strategy.
- Teachers must encourage students to complete all the activities in the CLIPS set since research on CLIPS shows that this is how students benefit most.

What Teachers Say About CLIPS:

"The concepts were introduced slowly and accessibly, and reinforced so that with confidence I can say all my students on an IEP can look at a graph and tell you the rule for that graph, can build a pattern from that graph and can give you a story related to the graph. I've never had that experience before. On the quizzes and assessments I've been doing, they've all been getting level 4 [out of 4]."

(Grade 7 teacher)

2. ALIGNING COMPUTER AND SMARTBOARD RESOURCES

Using CLIPS requires management of computer and interactive whiteboard resources:

- Teachers have had success allocating one computer per two students or setting up the classroom for small group use.
- Teachers who had interactive whiteboards and easy access to multiple computers or laptops in their classrooms found the implementation of CLIPS ideal.
- Putting the program on a central server facilitated ease of use for students.
- Ensuring access to headphones was important.

3. ESTABLISHING A COLLABORATIVE MATHEMATICS LEARNING CULTURE

CLIPS can be used as the focus of work in a professional learning community (same-grade or cross-grade groups). The CLIPS supply the math content and a way to engage students in understanding and applying that content.

Principals can focus on creating a culture that enables teachers to share their math thinking and teaching practice related to the CLIPS content.

"I learned a ton. This was the best PD – I am actually doing it, rather than hearing about something and then not implementing back in the classroom."
(Grade 7 teacher)

4. USING DATA

Facts you can use to set direction regarding CLIPS use:

- Teachers involved in the research study gained confidence in their instructional strategies from beginning to end. The quantitative effect size was large, suggesting that CLIPS and the related brief training offered teachers additional strategies for supporting students with difficult-to-learn mathematics content.

Although the focus of the students was the effect of CLIPS on student outcomes, we also found that, during the program, teachers became more confident about their instructional strategies than they were before. This was a surprising finding given the small sample size and the short duration of the study. The effect size was quite large.

- Introducing CLIPS has benefits for students, including enhanced achievement and improved attitudes towards themselves as math learners and about learning mathematics.

What Students Say About CLIPS:

"Having the pictures and the animation on CLIPS was good, so instead of having formulas again and again and again like you usually have, there are different kinds of pictures, the graph and the robot, too. So there was more than one way to see things, which helped a lot!...And this way it showed...you can put it in a graph, you can use just the formula, you can draw a picture. So that's what I really liked. That there was more than one way."
(Grade 8 student)

- High quality instruction combined with CLIPS is a most effective instructional decision.
- Students who completed all the activity sets in CLIPS for both trigonometry and linear growing patterns benefit the most, both in terms of achievement results and in attitudes towards learning mathematics (including towards learning with technology). This confirms findings from the previous research on CLIPS: Fraction (Ross & Bruce, 2009).

- One of the most consistent findings was the extent to which teachers were surprised by the learning students who had been identified as learning disabled and/or had been put on an Individual Education Plan (IEP) demonstrated. In all classrooms, students were pulled out for math remediation with a resource teacher. For this project, teachers chose to keep their learning disabled students in the classroom.

CLIPS come with quizzes and achievement tests that can be used to measure pre-post gains in student understanding. The principal can include these data in the tracking of students' math performance within and across grades (see web link below). Principals and teachers can use/adapt these tools to address local needs.

5. ENGAGING IN COURAGEOUS MATHEMATICS CONVERSATIONS

Generalist teachers may be reluctant to share ideas about mathematics teaching for fear of making a mistake. Principals can encourage teachers to take intellectual risks by focusing the conversations on CLIPS learning goals and activities. Teachers and students have 24/7 access to CLIPS (see web link below). They can work through activities at their own pace, receive scaffolded feedback on their electronic interactions and quiz themselves until they are comfortable with the concepts and skills.

"...they started to really wonder about how you could have a rule that would have a trend line with a negative slope. And a negative constant – they were really intrigued by the possibility of other quadrants of the graph. And I'm thinking, 'This is crazy! Who knew these kids would be so interested in the quadrants of a graph!'"
(Grade 8 teacher)

RESOURCES

NEW CLIPS are regularly posted at www.mathclips.ca

For a 12-minute virtual tour of clips, go to <http://www.edugains.ca/resources/CLIPS/viewers.swf>

To read research reports and articles on CLIPS, go to www.tmerc.ca

<http://legacy.oise.utoronto.ca/research/field-centres/ross/vita/htm>

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