WORKING WITH LEARNERS TO FIND THE EQUATION OF A STRAIGHT LINE FROM THE GRAPH

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The purpose of the workshop is to provide a platform for teachers from the Wits Maths Connect Secondary Project to share their professional development experiences with colleagues. The teacher-presenters have previously participated in professional development where they engaged with similar activities. In the proposed workshop teachers will present how they attempted the conceptual development of finding the equation of a straight line from the graph. The approach involved an alternative to the purely procedural approach to finding the linear equation. Workshop activities will focus on the development of the equation of the linear function and extending to its many representations.

TARGET AUDIENCE: Grade 9-10 teachers wanting to build conceptual understanding of the straight line

DURATION: 2 hours

MAXIMUM PARTICIPANTS: 40

MOTIVATION FOR THE WORKSHOP

In our work in the Wits Maths Connect Secondary Project we have seen poor learner performance in a Grade 10 Learning Gains post-test. For example at the end of Grade 10, 65% of learners were able to write down the x-intercept and y-intercept of a straight line, given the graph. However, less than 4% could correctly determine the equation of the straight line.

There is much evidence from both internal and external school mathematics examinations that the majority of learners perform below expectations. The divide between what teachers teach and what learners do is ever widening. In the project we believe it is important to examine our teaching practices, and to pay more careful attention to the *opportunities to learn* that we offer our learners.

Given that more learners are able to write down the x- and y-intercepts in the post-test, it seems reasonable to assume that the poor performance in producing the equation stems in part from difficulties with determining the gradient, and from learners' poor conceptual grasp of the properties of a straight line.

We believe that by addressing the concept of gradient, and by working with different representations of it, we might provide useful opportunities for our learners to learn. In the workshop participants will engage with the activities we have developed, and presenters will share experiences of working with learners on the activities.

Activity	Time (min)
Introduction & rationale	10
Activity 1: Finding the gradient and equation, given graph	25
Activity 2: Finding the gradient and equation, given a table	25
Activity 3: Finding the gradient using the gradient formula, then finding the equation	25
Connecting the activities together	15
Discussion and conclusions	20

An example of a workshop task is included below:

The diagram shows the graphs of 2 straight lines
a) What is the same about the lines?
b) What is different?
c) Will these graphs have the same equation?
   i) What will be the same in their equations?
   ii) What will be different?
   iii) What do we know about the equations?
   iv) What do we still need to find out?