DESIGNING A TRAJECTORY TO DEVELOP THE FRACTION CONCEPT IN THE INTERMEDIATE PHASE

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TARGET AUDIENCE: Intermediate Phase.

DURATION: 2-hour workshop

MAXIMUM NO. OF PARTICIPANTS: 30

MOTIVATION

Teachers will experience what it means to teach via problems, i.e. where the problem is the vehicle of learning. Concepts are constructed by working on appropriate problems which are designed to elicit reasoning about the concepts.

CONTENT

1. Introductory *discussion* of relevant issues e.g.
   "What does it mean to develop a concept as opposed to transmitting a procedure to follow?"
   "How is a learning trajectory designed?"
   "What are the underlying "Big Ideas" of the fraction concept?"
   "What are the common misconceptions that occur concerning fractions and how can they be prevented?"
   This should take up about 15 minutes of the workshop time.
2. Participants, in groups of three, will *solve problems* from the trajectory in the given sequence. The process will be interrupted regularly (after every one or two problems) for discussion. The purpose of the dicussion is to *analyse* the problem done (i.e. to *identify the mathematical intent* of every problem) according to the aspects of the "Big Ideas" that were identified. This will be done on a grid-like checklist where the aspects are listed. The list of aspects, the checklist and the list of problems are attached.
   This will take up the rest of the workshop time. The number of problems done will be adjusted according to the available time.

ABSTRACT

"Fractions" seems to remain a problem for Intermediate Phase learners despite efforts of teachers to give it special attention and to provide hands-on experiences with manipulatives. Emphasis on procedures in teaching and trajectories that reinforce rather then prevent misconceptions have been named as reasons for this. In the trajectory for teaching and learning fractions presented in this workshop the emphasis is on the reasoning and true engagement required from learners while dealing with situations concerning fractions.

Le Roux, A. (2013). Designing a trajectory to develop the fraction concept in the Intermediate Phase. In Z. Davis & S. Jaffer (Eds.), *Proceedings of the 19th Annual Congress of the Association for Mathematics Education of South Africa*, Vol. 2. (pp. 38 – 39). Cape Town: AMESA.

Participants will solve problems from the trajectory and analyse them according to aspects of the big ideas that underpin the fraction concept. Through the solving and analysing of the problems the mathematical intent of each problem should become clear. The workshop aims at giving participants a glimpse of problem centred teaching in action. This will be achieved by interrupting the problem solving activity after every one or two problems for discussion.

Notions like “learning trajectory”, “big ideas” and “development of a concept” will be clarified during the discussions part of the workshop. The following aspects of relevant Pedagogical Content Knowledge will be considered:

- preconceptions that learners bring with them
- the conditions that are favourable for learning

Common misconceptions concerning fractions will be pointed out and it will be shown how these misconceptions can be prevented by using an appropriate sequencing and by the choice of problems in the trajectory.