POLYA'S PROBLEM-SOLVING MODEL: SURFACE AREA AND PERIMETER IN AN AUTHENTIC CONTEXT

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TARGET AUDIENCE: Senior and FET phase

DURATION: 2 hours

MAXIMUM NO. OF PARTICIPANTS: 30 participants (more if venue allows)

MOTIVATION

This workshop demonstrates the use of Polya's problem-solving model on an open-ended problem in an authentic context and could enhance the participants' appreciation of the applicability

CONTENT

The participants explore a word-problem in a group context. The presenter facilitates the discussion in an interactive way. Materials (square paper, string, scissors, matches) are used to demonstrate certain principles practically. Time slot: First 45 minutes (Exploring step 1 to 3 of Polya's problem solving model). Second 45 minutes (Exploring step 4 of Polya's problem-solving model: Alternative solutions). Last 30 minutes (Exploring step 4 of Polya's problem-solving model: application of the solution in different contexts).

ABSTRACT

In South Africa, an important aim of mathematics education is to enhance learners' problem-solving abilities. George Polya suggests that a teacher should stimulate learners' curiosity by posing interesting problems in order to enhance their independent thinking abilities. In the first phase, learners must understand the verbal statement of the problem to such a degree that they can easily repeat the problem statement. During the second phase, a plan is made that consists of an outline of the calculations and constructions that will lead to the solution and it is regarded as the core aspect of finding the solution. The third phase is easier than devising a plan, because learners only need to exercise patience in order to successfully carry out the plan. The fourth phase is regarded as very instructive, because learners' knowledge is consolidated and their problem-solving skills are enhanced if they re-examine the problem-solving process. In this workshop, Polya's problem-solving model is applied to an authentic problem that mainly involves the relationship between surface area and perimeter. An exploration of the fourth phase yields interesting perspectives on alternative ways of solving the problem and the application of the solution in different contexts.

Du Toit, S. (2013). Polya's problem-solving model: surface area and perimeter in an authentic context. In Z. Davis & S. Jaffer (Eds.), *Proceedings of the 19th Annual Congress of the Association for Mathematics Education of South Africa*, Vol. 2. (pp. 21). Cape Town: AMESA.