

ABSTRACT

Grade 12 learners perform poorly in trigonometry in the final National Senior Certificate (NSC) examinations. The errors committed by learners in trigonometry lead to a high failure rate in trigonometry and hence in mathematics. The traditional teaching method that has found a home in many South African learning spaces is largely blamed for failing to effectively deal with learner errors in trigonometry. This study investigates probing learner errors in grade 11 trigonometry and the efficacy of professional noticing. The constructivist theory of learning framed the study and professional noticing the conceptual framework. Purposive sampling was used to select two schools in Johannesburg East District South Africa. The sample size was of $n = 176$ grade 11 mathematics learners from the two schools and five teachers. One school was taken as a control group with $n = 97$ learners and the other school became the experimental group with $n = 79$ learners. In addition, a questionnaire was used to gather information from the teachers about the learner errors and misconceptions they observed in their classes. Five teachers responded to the questionnaire and their responses were analysed qualitatively. For learners, after a pre-test was administered to study learner errors and misconceptions in trigonometry to both groups. Thereafter, the treatment group had an intervention using professional noticing approaches. Also, and probing to elicit learner thinking was done while the control group used a traditional teaching approach. A mixed method research was used and a quasi-experimental research design with a non-equivalent group design was employed. The pre-test scores for both groups were analysed using a t-test and this test revealed that both groups were at the same level in terms of trigonometry performance. The scores from the post-tests were analysed using ANCOVA. ANCOVA test revealed that the intervention used with the experimental group was superior in improving both dealing with learner errors and overall performance on the trigonometry topic. An error analysis conducted post-intervention revealed that learners managed to overcome their errors and misconceptions in the treatment group compared to the control group.

Keywords: Professional noticing, probing, constructivism, learner errors and misconceptions, mathematics, trigonometry.