

ABSTRACT

Charity Muchoko (1708159) “Investigating Algebraic Structure Sense of Grade Ten Indonesian School Students in Solving Algebraic Equations” under the supervision of Dr H. Sufyani Pabrawanto, M. Ed. and Al Jupri, S.Pd. M. Sc., Ph.D

Algebra has been considered as a “gate-keeper” to life and a key aspect for courses in advanced Mathematics and Science for secondary and post-secondary education. It argued that; algebraic structure sense is one aspect that can help exhibit students’ mathematical proficiencies to enhance 21st century skills in solving problems. This research took a qualitative case study to investigate 24 grade ten Indonesian students’ algebraic structure sense ability and identify the difficulties that they encounter in solving structure sense equations. An algebraic structure sense test was administered, followed by in-depth interviews on 7 of the 24 subjects who showed a variety of algebraic structure sense abilities and difficulties. Data was analysed by coding and constant comparison of similar data. Results indicated that some grade ten students have algebraic structure sense. However most of them are less accustomed to algebraic structure sense strategies; rather they are more comfortable with procedural strategies. Some students were able to recognise structure in its simplest form; deal with terms as single entities and some were able to manipulate structures to make best use of structure. Results also indicated that some students are quite flexible in solving algebraic structure sense equations whilst some are not. In addition, students’ difficulties in vertical *mathematization* were noticed and some students made transfer and omission errors whilst some had misunderstanding of algebraic terms and algebraic manipulations. However, results could not be generalized over small number of subjects; a longitudinal study on Indonesian school students’ algebraic structure sense is highly recommended.

Key Words: Algebraic proficiencies, algebraic structure sense, *mathematization*, equations and algebraic difficulties.

ABSTRAK

Charity Muchoko (1708159) “Investigating Algebraic Structure Sense of Grade Ten Indonesian School Students in Solving Algebraic Equations” yang dibawah bimbingan Dr H. Sufyani Pabrawanto, M. Ed. and Al Jupri, S.Pd. M. Sc., Ph. D.

Materi aljabar menjadi "penjaga gerbang" untuk kehidupan dan bahan dasar untuk semua pembelajaran matematika di sekolah menengah dan seterusnya, penelitian ini mengambil studi kualitatif deskriptif untuk menyelidiki pengertian *algebraic structure sense* pada dua puluh empat ($n = 24$) siswa kelas sepuluh di salah satu sekolah menengah atas di Bandung, Indonesia sebagai langkah dalam menunjukkan kemampuan aljabar mereka dalam menyelesaikan persamaan linear dan persamaan kuadrat. Melalui tes *structure sense* pensil-dan-kertas pada persamaan aljabar, diikuti oleh wawancara mendalam pada tujuh siswa pelajari yang dipilih berdasarkan proses kerja mereka pada tes *structure sense*. Hasil penelitian ini menunjukkan bahwa; beberapa siswa Indonesia kelas 10 sudah bisa menyelesaikan masalah dengan strategi *structure sense*. Namun; sebagian besar; beberapa siswa tersebut belum bisa memakai strategi *structure sense*. Siswa lebih terbiasa dengan strategi prosedural (**PS**) daripada strategi *structure sense* (**SS**). Selain itu, beberapa siswa bisa menyelesaikan persamaan aljabar dengan cara yang berbeda. Siswa juga menunjukkan beberapa kesulitan dalam menyelesaikan persamaan *algebraic structure sense*. Ya itu; kurangnya proses *vertical mathematization*, kesalahan komputasi, kurang memahami istilah variabel dan *equivalence relations*, kesalahan dalam operasi aljabar dan kurangnya kepercayaan diri terhadap pemikiran mereka. Bagaimana kemampuan *algebraic structure sense* siswa sekolah menengah Indonesia dalam menyelesaikan persamaan aljabar bisa ditingkatkan dibiarkan terbuka untuk studi lebih lanjut.

Kata-kata kunci: Algebraic Proficiencies, algebraic structure sense, linear and quadratic equations, algebraic difficulties