The aim of this study was to offer a comprehensive description of 423 secondary school students’ level of understanding of the three attributes deemed necessary for solving stoichiometry problems. The three attributes were proportional reasoning, mole concept and chemical equation. This study also investigated the students’ ability to solve stoichiometry problems and whether the three attributes have any significant relationship with the ability to solve the stoichiometry problems from the perspectives of academic ability. The students were given an Achievement Test to answer the 19 test items which were divided into three sections of A, B and C and three items for problem solving in Section D. Section A tested the understanding of the proportional reasoning, Section B and C the understanding of the mole concept and the chemical equation respectively. Section D was to determine the ability to solve stoichiometry problems. Cross-sectional descriptive statistics method was employed and the data collected were analysed by frequency counts in terms of percentages. Correlational analysis and stepwise multiple linear regression were employed to determine the relationship between the three attributes with the ability to solve the stoichiometry problems. The findings suggested that students were unable to apply the proportional reasoning learned in mathematics to solving proportional reasoning in chemical equation. The level of understanding to the meaning of the mole concept related to number of particles and mass is on the average. Pertaining to chemical equation, the level of understanding is below average. Students found difficulties in balancing the chemical equation when the ratio of the coefficients of the reactants and products are not 1 : 1 and also poor in explaining the meaning of the coefficients in the chemical equation. The level of ability to solve the stoichiometry problems is also low among the students. However, with better understanding of the three attributes, the ability to solve the problems increases. Generally, the higher achiever students show better performance for all the sections. ANOVA comparisons of means and Tukey HSD test show there is no significant difference between the mean scores for the average and low academic ability students. A need for innovative and creative teaching materials seems essential to enhance the level of understanding of the three attributes and to overcome misconceptions students have of the attributes in order to increase students’ ability to solve stoichiometry problems.

The data-driven contrastive study between the corpora of native and non-native learners enables the researcher to uncover the difficulties that learners face in using these lexical items. The meticulous processes involved in compiling the non-native learner corpus and the extraction of verb-noun collocations add to the uniqueness of the thesis. The thesis addresses three main questions through a linguistic analysis using both quantitative and qualitative methods with the assistance of WordSmith Tools. First, it seeks to examine linguistic elements of the lexical verbs; second, to ascertain the phraseological patterns of verb-noun collocations; and third, to identify the non-native elements found in the use of lexical verbs and verb-noun collocations. The results reveal some similarities and differences that help in understanding how lexical verbs and verb-noun collocations are actually used by both native and non-native learners in writing. What is most obvious is the Malay ESL learners’ lack of vocabulary repertoire, which indicates a lack of vocabulary acquisition. The analysis of verb-noun collocations reveals an array of phraseological deviations that stem from a lack of knowledge in syntagmatic relationships between the two lexical elements in the collocations. It is, thus, essential for learners to learn how to use a variety of lexical verbs, including the lexical patterns and grammatical patterns of verb-noun collocations in order to use them appropriately, especially when these patterns differ from their L1. A framework on learning and teaching of the lexical verbs and verb-noun collocations has been proposed based on the findings. This framework can contribute to the improvement of an English syllabus, material design and teaching methodology. It is hoped that the most important contribution of this thesis is to increase awareness of the importance of phraseology in ELT so that various measures can be taken to enhance learners’ communicative competence, which should be the aim of every English course.