

## Representational Competence Profile of Secondary Students in Understanding Selected Chemical Principles

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**Abstract :** Assessing students' understanding in the microscopic level of an abstract subject like chemistry poses a challenge to teachers. Literature reveals that the use of representations serves as an essential avenue of measuring the extent of understanding in the discipline as an alternative to traditional assessment methods. This undertaking explored the representational competence profile of high school students from the University of Santo Tomas High School in understanding selected chemical principles and correlate this with their academic profile in chemistry based on their performance in the academic achievement examination in chemistry administered by the Center for Education Measurement (CEM). The common misconceptions of the students on the selected chemistry principles based on their representations were taken into consideration as well as the students' views regarding their understanding of the role of chemical representations in their learning. The students' level of representation task instrument consisting of the main lessons in chemistry with a corresponding scoring guide was prepared and utilized in the study. The study revealed that most of the students under study are unanimously rated as Level 2 (symbolic level) in terms of their representational competence in understanding the selected chemical principles through the use of chemical representations. Alternative misrepresentations were most observed on the students' representations on chemical bonding concepts while the concept of chemical equation appeared to be the most comprehensible topic in chemistry for the students. Data implies that teachers' representations play an important role in helping the student understand the concept in a microscopic level. Results also showed that the academic achievement in the chemistry of the students based on the standardized CEM examination has a significant association with the students' representational competence. In addition, the students' responses on the students' views in chemical representations questionnaire evidently showed a good understanding of what a chemical representation or a mental model is by drawing a negative response that these tools should be an exact replica. Moreover, the students confirmed a greater appreciation that chemical representations are explanatory tools.

**Keywords :** chemical representations, representational competence, academic profile in chemistry, secondary students

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