

**PROBING STUDENTS' HIGHER-ORDER THINKING SKILLS IN
GRADE 13 CHEMISTRY: A CASE STUDY FROM
KANDY EDUCATION ZONE, SRI LANKA**

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Fostering higher-order thinking skills (HOTS) in chemistry education is essential for developing students' analytical, problem-solving, and creative abilities. Recognizing this necessity, the revised chemistry syllabus implemented in 2017 by the Ministry of Education, Sri Lanka, endeavoured to integrate HOTS through various teaching-learning strategies. This research aims to assess the present status of HOTS in Grade 13 students across six public schools in the Kandy Zone of Education, Sri Lanka. A descriptive research design with a quantitative framework was employed, and a HOTS evaluation tool was developed following Anderson and Krathwohl's revised Bloom's Taxonomy, 2001. This tool consisted of 12 two-tier multiple-choice (TTMC) questions and three double-statement questions designed to evaluate students' understanding of chemical concepts with reasoning related to the three levels; Analysis, Evaluation and Creation. The validity and reliability of the instrument were established through expert judgment and Cronbach's alpha. A convenient sample of 133 (45 male and 88 female) students from the designated schools underwent the assessment. Descriptive statistics revealed that over 90% of the students answered less than 50% of the questions correctly. In terms of the three levels of HOTS, the correct responses were 26.8%, 24.4%, and 17.5% for tiers 1 and 2, and it was 44.5%, 37.3% and 36.3% for tier 1 only. The mean values for those three levels were 1.61, 1.22, and 0.70 for tiers 1 and 2 and 2.67, 1.86, and 1.45 for tier 1, respectively. The findings indicate a lack of students' skills in all three levels of HOTS. A higher percentage of correct responses for tier 1 compared to tier 2 suggests that students are relying more on rote memorization than on a deeper understanding of chemistry concepts. The study highlights the urgent need for teaching-learning interventions to enhance HOTS among students and sets the stage for further studies.

Keywords: Bloom's taxonomy, Higher-order thinking skills, Reliability, Two-tier multiple-choice, Validity