

# The Development of Learning Chemistry Module Integrated With Green Chemistry and Ethnoscience to Development of Students' Generic Science Skills and Soft Skills of Conservation in Central Java

<sup>1</sup>S. Sudarmin, <sup>2</sup>Woro Sumarni, <sup>3</sup>Laily Zahro, <sup>4</sup>Pawestri Farah Diba, & <sup>5</sup>Asfia Rosita

<sup>1,2</sup> Department of Chemistry, Faculty of Mathematics and Science -Universitas Negeri Semarang, Indonesia

<sup>3,4,5</sup> Chemistry teacher, Middle School chemistry teacher at Kudus and Semarang Central Java-Indonesia

<sup>1</sup>Corresponding Author: sudarmin@mail.unnes.ac.id

## ABSTRACT

**Purpose** - This study developed and applied the chemistry learning module integrated with green chemistry and ethnoscience to develop generic skills of science and soft skills of conservation of high school students in Central Java, Indonesia.

**Methods** – The participants consisted of Chemistry education students (22 students), students from MAN I Semarang (68 students), students from SMA Negeri 1 Bae Kudus (69 students), and students from SMA Negeri I Semarang (69 students). Development of chemistry learning modules was conducted through stages of defining, designing, and development to produce appropriate and effective chemical learning modules. Data collection techniques passed the test instrument to measure the mastery of generic science skills, observations and questionnaires to find out the soft skills of conservation, and the students' responses to the chemistry learning module and the developed scientific approach. Data analyses included feasibility analysis, module effectiveness and chemistry learning approach. Analysis of generic science skills and conservation soft skills was carried out through N-gain and t-test.

**Findings** - The results of this study revealed that the chemistry learning module integrated with green chemistry and ethnoscience was feasible and effective. Generic science skills and students' conservation soft skills achieved moderate and high performance levels based on N-gain test results; as well as students' cognitive learning outcomes were significant.

**Significance** – The chemistry learning module integrated with green chemistry and ethnoscience was feasible, valid, reliable and effective to develop generic skills of science and soft skills of conservation of among high school students.

**Keywords:** Learning modules, Green chemistry, Ethnoscience, Generic science skills, Soft skills, Conservation