

## Using SOLO Taxonomy to Explore the Levels of Representation Models in Scientific Inquiry Activities: An exploration based on 8<sup>th</sup> Grade Physics Fair

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*Models play a core role in science. Engaging students in science exhibitions is a way to involve them in modeling activities similar to those practiced by scientists. This study adopted the ex post facto method to investigate the types and hierarchical levels of modeling processes which were present in the scientific inquiry activities of eighth grade students. The authors integrated a typology of models proposed by Boulter and Buckley (2000) and Structure of the Observed Learning Outcome (SOLO) taxonomy by Biggs and Collis (1982) to evaluate the typology of models used. The results revealed that (1) within the same inquiry phase, students constructed different types of representational models, including concrete, gestural, visual, verbal, and mathematical, each with a specific purpose. In other phases they constructed the same types from models that are uni-structural to ones that are extended and abstract. (2) Through various inquiry phases, the students gradually understood the variables of the project they worked on in order to develop a variety of corresponding representation models. Accordingly, school teachers are recommended to provide a progression of inquiry-based science activities that emphasize on introducing concrete and gestural representational models, forming visual and verbal models, and constructing mathematical models.*

**Keywords:** *ex post facto method, modeling, science fair, SOLO taxonomy, typology of model*

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