

# Prediction-Observation-Explanation (POE): An Effective Approach to Science Education

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*“Education is not the filling of a pail, but the lighting of a fire.”  
-William Butler Yeats*

Prediction-observation-explanation (POE) as a teaching strategy was advanced by Australian researchers White and Gunster in 1992. It has been primarily adopted in science education and project-based learning. With POE, the students develop the understanding of a specific scientific concept through the exploratory process consisting of hypothesis (prediction), experimentation (observation), and analysis/presentation (explanation) (Yurtyapan & Kandemir, 2022). Each of the three steps of POE has its own purpose (White & Gunstone, 1992; Nalkiran & Karamustafaoglu, 2020; Baydere, 2021). “Prediction” is for the students to make hypotheses about inquiry on a concept or an event in question and give their justifications. This step is to awaken the students to prior knowledge relevant to the new concept and identify possible gaps or misconceptions in them. “Observation” is for the students to observe the inquiry process of the concept or event. The teacher may present the concept or event through explanations, demonstrations, or experiments, and the students are required to record observations before, during, and after the experiment. “Explanation” is for the teacher to elaborate on the concept or event and give explanations of the discrepancies between the students’ predictions and observations, in order to enhance their grasp of the subject matter.

POE is regarded as a student-centered instructional approach (Çingil Baris, 2021; Yurtyapan & Kandemir, 2022), because it enables the students to actively engage in learning through hands-on activities, such as experiments, while also giving them the chances to discover and correct misconceptions by examining their prior knowledge (Harman & Yenikalayci, 2022). Furthermore, with POE, the teacher not just effectively delivers scientific knowledge to the students but also piques their inquisitiveness and foster their critical thinking (Alfiyanti et al., 2020; Baydere, 2021). Much empirical research has been conducted to validate the positive effects of POE in science education. For instance, Prabawati et al. (2020), using quasi-experimental design, analyzed the effects of POE on student learning outcomes to find that the experimental group taught with the POE method outperformed the control group with a traditional teaching method in all three aspects: cognitive, affective, and psychomotor.

The effectiveness and significance of POE in science education have been widely recognized in the education world. Currently, this method is mostly applied in the conventional classroom setting, where the students obtain practical observations from physical manipulations, laboratory experiments, and other experiences. Nevertheless, with the ad-

vancement of technology, simulative experiments are getting common given the possible danger of certain scientific experiments or inavailability of experimental equipment in some schools. Is POE an effective approach in learning scenarios based on simulative observations? This remains a question. *The Effect of Simulative Observations in the POE Method on Academic Achievement and Problem-Solving Skills of 8th Grade Students* in this issue is an examination of the impact of POE on student outcomes in a simulation setting. Using quasi-experimental design, the study investigates the effectiveness of the POE method in the teaching of the Simple Machines unit based on Algodoo software-assisted simulative observations (XXX, 2025). Despite its small sample size and short experimental duration, the study's research findings can serve as empirical evidence for the implementation of simulative observation-based instruction in cases of limited access to physical teaching resources.

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