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## Exploration of Conceptual Understanding and Science Process Skills: A Basis for Differentiated Science Inquiry Curriculum Model

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**Abstract:** This qualitative study explores the students' conceptual understanding and science process skills through differentiated science inquiry leading to a differentiated science inquiry curriculum model. By way of maximum variation sampling, 10 participants' actual output was subjected to data analysis. Through phenomenographic analysis and in-depth interview, the conceptual understanding of students as based on SOLO (Structure of Observed Learning Outcome) Taxonomy Model and DOK (Depth of Knowledge) Levels in Science revealed that as they engaged in DSI activities, they were able to exhibit their conceptual understanding characterized by integrating the different aspects of a concept into a coherent whole and extending it to making connections not only within the given subject area, but also beyond it. They were able to conceptualize at a higher level of abstraction and look at ideas in new and different ways. They showed recall of information, made some decisions on how to approach the problem, displayed deep knowledge using reasoning, planning, evidence and selected or devised one approach among many alternatives on how the situation can be solved. Chemistry concepts were strengthened and understood from their basic to complex tenets. These results led the students to achieve a range of accelerated progression as indicated by a positive transition from their prior understanding to a new conceptual improvement. By means of methodological triangulation, which involves the convergence of data from multiple data collection sources utilizing self-assessment of science process skills inventory (SPSI), direct observation, actual performance task assessment (APTA) with in-depth probing interview and document analysis, the science process skills of students were fully displayed, practiced, and applied as they engaged in higher levels of inquiry thereby directing them to a progressive manifestation of the basic and integrated science process skills.

**Key words:** Differentiated Science Inquiry; Conceptual Understanding; Science Process Skills; Curriculum Model; Chemistry concepts