

**PENERAPAN MODEL *INTERACTIVE CONCEPTUAL INSTRUCTION*  
BERBANTUAN SIMULASI VIRTUAL UNTUK MEMPERBAIKI MODEL  
MENTAL SISWA SMA PADA MATERI HUKUM GAS IDEAL**

TESIS

Diajukan untuk memenuhi sebagian syarat untuk memperoleh  
Gelar Magister Pendidikan Fisika



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BANDUNG, 2019

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Sebuah tesis yang diajukan untuk memenuhi salah satu syarat memperoleh gelar  
Magister Pendidikan (M.Pd.) pada Program Studi Pendidikan Fisika,  
Sekolah Pascasarjana, Universitas Pendidikan Indonesia.

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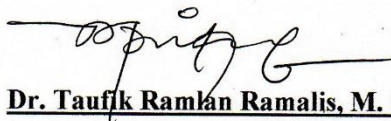


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**ABSTRAK**

Beberapa studi mengenai pengukuran model mental telah dilakukan. Penelitian sebelumnya menunjukkan bahwa siswa memiliki model mental yang keliru mengenai gas ideal. Penelitian ini bertujuan untuk memperoleh gambaran mengenai karakteristik pembelajaran dan perubahan model mental pada materi hukum gas ideal melalui penerapan model *Interactive Conceptual Instruction* berbantuan simulasi virtual. Metode yang digunakan adalah *pre-experiment* dengan desain *one group pretest-posttest design*. Populasi yang dipilih adalah siswa kelas XI di salah satu SMA swasta di Kota Sukabumi dengan sampel kelas XI IPA 1 dan jumlah sampel sebanyak 31 siswa. Instrumen yang digunakan yaitu lembar observasi keterlaksanaan pembelajaran dan tes pengukuran model mental. Model *Interactive Conceptual Instruction* berbantuan simulasi virtual pada materi hukum gas ideal dalam penelitian ini meliputi 4 fase pembelajaran yaitu: fase fokus konsep, fase penggunaan teks, fase bahan ajar dengan aktivitas meneliti menggunakan simulasi PhET dan simulasi android, serta fase interaksi kelas. Pada fase fokus konsep, siswa melakukan percobaan sederhana. Pada kegiatan ini siswa dilatih untuk menjelaskan fenomena yang diberikan oleh guru. Pada fase penggunaan teks, siswa menggunakan buku paket mereka untuk menemukan hukum fisika apa yang sesuai dengan percobaan sederhana yang telah dilakukan. Pada fase bahan ajar dengan aktivitas meneliti menggunakan simulasi, siswa dilatih untuk memahami gerak partikel dan hubungan antar variabel. Pada fase interaksi kelas, siswa berdiskusi dalam kelompok untuk menemukan fenomena lain yang terkait dengan fenomena yang diberikan oleh guru. Dari hasil analisis data, diperoleh bahwa, penerapan model *Interactive Conceptual Instruction* berbantuan simulasi virtual dapat memperbaiki model mental siswa SMA pada materi hukum gas ideal.

Kata kunci: model *Interactive Conceptual Instruction*, simulasi virtual, model mental, hukum gas ideal

**IMPELEMENTATION OF INTERACTIVE CONCEPTUAL INSTRUCTION  
MODEL WITH VIRTUAL SIMULATION TO IMPROVE MENTAL MODEL OF  
SENIOR HIGH SCHOOL STUDENTS ON IDEAL GAS LAW**

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**ABSTRACT**

Several studies on measuring mental models have been carried out. Previous research shows that students have a wrong mental model about ideal gas. This study aims to obtain an overview of the characteristics of learning and mental model changes in ideal gas law through the implementation of Interactive Conceptual Instruction models with virtual simulations. The method used was pre-experiment with the design of one group pretest-posttest design. The population chosen was class XI students in one of the senior high schools in Kota Sukabumi with samples of class XI IPA 1 and a total sample of 31 students. The instruments used were observation implementation learning sheets and mental model measurement tests. The Interactive Conceptual Instruction model assisted by virtual simulation on ideal gas law in this study includes 4 learning phases: concept focus phase, text usage phase, research-based teaching material phase using PhET simulation and android simulation, and class interaction phase. In the focus concept phase, students conduct simple experiments. In this activity students are trained to explain the phenomenon given by the teacher. In the text usage phase, students use their textbooks to find out what laws of physics are compatible with the simple experiments that have been carried out. In the phase of research-based teaching materials using simulation, students are trained to understand the motion of particles and the relationships between variables. In the class interaction phase, students discuss in groups to find other phenomena related to the phenomenon given by the teacher. From the results of data analysis, it was found that, the application of the Interactive Conceptual Instruction model with virtual simulations can improve the mental model of high school students in ideal gas law.

Keyword: interactive conceptual instruction model, virtual simulation, mental model, ideal gas law

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