PENGEMBANGAN *DUAL CONDITIONED LEARNING MODEL-UTILIZING MULTIMODE TEACHING* (DCLM-UMT) UNTUK MENGOPTIMALKAN PEMAHAMAN KONSEP FISIKA DASAR CALON GURU

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ABSTRAK

Penelitian ini bertujuan mengembangkan *Dual Conditioned Learning Model-Utilizing Multimode Teaching* (DCLM-UMT) pada perkuliahan Fisika Dasar II untuk meningkatkan pemahaman konsep, mengurangi miskonsepsi dan mengubah konsepsi mahasiswa calon guru. Metode penelitian yang digunakan adalah *mixed methods* yang mengandung proses pengembangan DCLM-UMT, meliputi: penyusunan, validasi, dan ujicoba yang dilakukan di salah satu LPTK di Jawa Barat. Kajian difokuskan pada proses pembangunan karakteristik DCLM-UMT untuk Fisika Dasar II, keefektivan penggunaan DCLM-UMT dibandingkan dengan perkuliahan konvensional, penggunaan DCLM-UMT dalam mengubah konsepsi mahasiswa pada konsep medan vektor, tanggapan mahasiswa dan dosen terhadap DCLM-UMT, serta kekuatan dan kelemahan implementasi DCLM-UMT. Data dikumpulkan melalui tes diagnostik *Fields Conceptual Change Inventory* (FCCI), lembar observasi, dan kuesioner tentang respons mahasiswa dan dosen terkait kehandalan dan kelemahan program. Analisis data dilakukan melalui analisis tes yang dilakukan dengan menggunakan analisis gain dinormalisasi <g> sedangkan analisis data non-tes menggunakan persentase serta kodifikasi secara kualitatif. Proses pengembangan program DCLM-UMT menghasilkan karakteristik sebagai sebuah *novelty* yang menitik-beratkan pada: pembelajaran yang dapat memfasilitasi dua kondisi konsepsi mahasiswa (DCLM), penggunaan *multimode teaching* (misalnya modus simulasi dan animasi komputer, *Conceptual Change Text*/CCT, dan *Predict, Discuss, Explain, Observe, Discuss, Explore,* dan *Explain*/PDEODE*E). Hasil analisis data menunjukkan bahwa pengembangan program DCLM-UMT secara efektif dapat lebih menanamkan pemahaman konsep, pengurangan miskonsepsi, dan pengubahan konsepsi dibandingkan dengan pembelajaran konvensional dengan kategori sedang. Hasil analisis data angket menunjukkan bahwa mahasiswa dan dosen memberikan tanggapan positif terhadap pengembangan DCLM-UMT dalam perkuliahan Fisika Dasar II.

Kata Kunci: model DCLM-UMT, pemahaman konsep, Fisika Dasar, pengubahan konsepsi, miskonsepsi, medan listrik, medan magnet

DEVELOPING DUAL CONDITIONED LEARNING MODEL-UTILIZING MULTIMODE TEACHING (DCLM-UMT) TO OPTIMIZE PRE-SERVICE TEACHERS' CONCEPTUAL UNDERSTANDING ON BASIC PHYSICS

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ABSTRACT

The aim of this research is to develop Dual Conditioned Learning Model-Utilizing Multimode Teaching (DCLM-UMT) in the Basic Physics II course which is able to optimize students' understanding. The research methodology was mixed methods that contained developing process of DCLM-UMT, consisted of: define, design and develop in the one of Teachers Preparations Program (LPTK) in West Java. The study was focused on developing of DCLM characteristic of Basic Physics II course, the effectiveness of utilizing DCLM-UMT compared to conventional setting, the using of DCLM-UMT in term of changing students' conceptions on electric field and magnetic field, students' and lecturers' responses to DCLM-UMT and strengths and weakness of DCLM-UMT in its implementation. The data was collected through diagnostic testing by using Fields Conceptual Change Inventory (FCCI) which has been developed and the test was administered before and after intervention. The observation sheet and questionnaire regarded to students' and lecturers' responses for measuring strengths and weakness of the program were also used for collecting the data. The data was analyzed through test analysis by using normalized gain <g> while non-test analysis by using the percentage of quantitative data and the codding of qualitative data in accordance with the conceptual changes' categories. The developing process of DCLM –UMT produced characteristics as novelty which is focused on: the learning that could facilitate two conditions of students' conceptions (DCLM), the using of multimode teaching (i.e. EPBCC, CCT and CCSL) which were diagnosed through instrument diagnostic test of FCCI. The results show that program development of DCLM-UMT is effectively able to enhance students' understanding, to decrease misconceptions and to change students conceptions compared to conventional teaching on electric field and magnetic field conceptions in moderate category.

Keywords: DCLM-UMT, students' understanding, Basic Physic, conceptual change, misconceptions, electric and magnetic fields