Profile of Students' Collaborative Problem Solving Skill, Conceptual Understanding and Attitudes in Regard to Learning Style After Learning Circulatory System Using ED-P

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ABSTRACT

Collaborative problem solving (CPS) is currently regarded as an essential 21st century skills that could be fostered through project based learning. On the other hand, the demand of more STEM professionals calls for the incorporation of engineering into science learning. However, earlier studies have not yet investigated how such learning facilitates students with diverse learning style to acquire skills, understanding and attitudes. Through descriptive analysis method, this study investigate how the integration of engineering design into project based learning which is called Engineering Design Project (ED-P) could foster students' CPS, conceptual understanding and attitudes toward science and engineering career in regard to learning style. 14 students participated in the lesson involving collaborative project to solve problem through engineering design process. To capture students' collaboration skills, direct observation throughout the lesson is done. Students' problem solving skills, conceptual understanding and attitudes toward science and engineering career were measured by using tests and rating scale administered before and after the lesson implementation. Findings show the lesson facilitated all students to learn in the way that correspond to their learning style thus enabling them to acquire particular skills, understanding and attitudes. During collaborative work, students demonstrated varied level of collaboration skills which include participation, perspective taking and social regulation skills. After lesson implementation students were able to demonstrate higher level of problem solving skills and better conceptual understanding about disease in blood circulation system on understanding, applying, analyzing and evaluating domains. In addition, students demonstrated more positive attitudes toward science and engineering career.

Keywords: engineering design; collaborative problem solving; conceptual understanding; science and engineering career; learning style

Profil Keterampilan *Collaborative Problem Solving*, Pemahaman Konsep dan Sikap Siswa dilihat dari Gaya Belajar Setelah Pembelajaran Sistem Peredaran Darah Menggunakan *ED-P*

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ABSTRAK

Collaborative problem solving (CPS) dianggap sebagai salah satu keterampilan abad 21 yang esensial dimana keterampilan ini dapat dikembangkan melalui pembelajaran berbasis proyek. Disisi lain, kebutuhan akan ahli di bidang STEM menuntut adanya integrasi aktifitas *engineering* dalam pembelajaran IPA. Sejauh ini belum ada penelitian yang mengkaji mengenai bagaimana pembelajaran tersebut memfasilitasi siswa dengan berbagai gaya belajar untuk mengembangkan keterampilan, pengetahuan dan sikap tertentu. Melalui penelitian dengan metode deskriptif analitik, penelitian ini menyingkap bagaimana integrasi antara *engineering design* dan pembelajaran berbasis proyek yang kemudian disebut sebagai *Engineering Design Project (ED-P)* mampu mengembangkan keterampilan *CPS*, pemahaman konsep dan sikap siswa terhadap karir di bidang sains dan engineering dilihat dari gaya belajar siswa. Sebanyak 14 orang siswa ikut berpartisipasi dalam pembelajaran dimana siswa bekerja dalam sebuah proyek untuk menyelesaikan masalah secara kolaboratif melalui aktifitas *engineering*. Observasi langsung selama pembelajaran dilakukan untuk mengukur keterampilan kolaborasi siswa. Keterampilan pemecahan masalah dan pemahaman konsep siswa diukur menggunakan *pre-test* dan *post-test*. Sedangkan sikap terhadap karir dalam bidang sains dan *engineering* diukur melalui skala sikap. Temuan penelitian menunjukkan bahwa pembelajaran dengan *ED-P* mampu memfasilitasi siswa untuk dapat belajar sesuai dengan gaya belajarnya. Selama kegiatan kelompok, siswa menunjukan keterampilan kolaborasi dalam berbagai kategori yang mencakup elemen *participation*, *perspective taking* dan *social regulation*. Setelah pembelajaran dengan *ED-P* siswa menunjukan keterampilan pemecahan masalah yang lebih baik yang mencakup elemen *task regulation* dan *knowledge building and learning*. Selain itu siswa menunjukkan pemahaman konsep yang lebih baik pada domain memahami, mengaplikasikan, menganalisis dan mengevaluasi. Disamping itu, siswa menunjukkan sikap yang lebih positif terhadap karir di bidang sains dan *engineering*.

Kata kunci: *engineering design*; *collaborative problem solving*; pemahaman konsep; sikap; gaya belajar