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# Problem-Based Learning and Authentic Assessment as an Implementation of Outcomes-Based Education in the Computer Engineering Program of Ateneo de Davao University

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## ABSTRACT

The 21st century education challenges educators to expose students to a wide variety of circumstances and problem situations where they are required to apply the skills they have learned. In engineering education, these are mostly limited to simulated scenarios which are devoid of real and actual interactions with the problems in the community. This article aims to describe how problem-based learning pedagogy and authentic assessment are used in the Computer Engineering program of Ateneo de Davao University as an implementation of the outcomes-based education. This is a descriptive & qualitative research that utilizes focus group discussions as a methodology for achieving its objective. This study uses the frame of experiential learning that is problem-driven, community-based, multi-disciplinary, integrative & collaborative. The computer engineering program uses a multi-disciplinary and integrative approach to problem-based learning through the service-learning program of the institution. This provides the students with an opportunity to interact with a community, identify its problems, analyze and create a concrete solution applying their acquired skills. Since the students are engaged with the community's actual and real problems, they will be assessed using authentic assessment mechanisms. Experiential learning, problem-based pedagogy with authentic assessment open doors of opportunities for a more meaningful and relevant computer engineering program.

## KEYWORDS

Authentic Assessment, Experiential Learning, Outcomes-Based Education, Problem-Based Learning, Service-Learning

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## 1. INTRODUCTION

The 21st century education challenges educators to expose students to a wide variety of circumstances and problem situations where they are required to apply the skills they have learned. In Engineering education, these are mostly limited to simulated scenarios which are devoid of real and actual interactions with the problems in the community.

Curriculum is a key factor in defining program outcomes. It typically consists of modules and courses, which should be linked together to produce the desired learning outcomes for students (Malkki & Paatero, 2015). With the implementation of Outcomes-Based Education (OBE) the student's outcomes are clearly defined based on the Washington Accord's criteria for graduate engineering attributes (Rashid, 2013).

This paper is grounded in the theoretical framework of two key components namely Problem Based Learning (PBL) and Authentic Assessment (AA) tasks. In the curriculum development, PBL was utilized in the learning and teaching methods while AA was utilized in the reflection and assessment of student's performance.

### 1.1. Background and Motivation

On June 2013 during the annual faculty meeting and strategic department planning, the Computer Engineering Department under the School of Engineering and Architecture of Ateneo de Davao University came up with an idea of integrating Service Learning to possible major subjects in Computer Engineering course. It was a difficult task to accomplish since subjects are already assigned to specific faculty members as well as the course outline are already laid out. With the verge of the upcoming implementation of the K12 program (Senior High School – additional 2 years after Junior High School), the department came out with a new set of curriculums and at the same time made it as an opportunity to integrate Service Learning in some of its major subjects. One of these subjects was Computer Hardware Fundamentals offered in the first-year level. In order to achieve our goal a new approach has to be implemented. We utilized the Outcomes Based Education Concept and IT Service Management Curriculum Elements Framework (Aničić & Mekovec, 2016) as a guide to revise the syllabus and course outline (Figure 1).

### 1.2. Course Aim

The course's main aim was to teach students the fundamentals of computer hardware and peripherals, including its underlying functions and trend of technologies. The course was organized into 18 hours of lectures and 36 hours of laboratory exercises and experiments over an 18-week period. The main idea behind implementing the course exercises and experiments was to, as much as possible, engage students in a similar environment as to the one experienced by technical personnel and computer

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