

A CASE STUDY OF SERVICE LEARNING AND CIVIC ENGAGEMENT FOR MECHATRONICS ENGINEERING STUDENTS THROUGH A COURSE PROJECT

Bashar K. Hammad¹, Randa A. Mahasneh², and Ahmad M. Khasawneh³

¹Mechatronics Engineering Department, The Hashemite University, Zarqa, Jordan

²Educational Psychology Department, The Hashemite University, Zarqa, Jordan

³Computer Information System Department, The Hashemite University, Zarqa, Jordan

ABSTRACT

This paper presents a case study of integrating a service learning project into an undergraduate Mechatronics engineering course titled “Building Automation” for the first time at the Hashemite University in Jordan. The project requires students to visit hospitals to learn about a variety of building systems that they have come across during their course lectures. After grasping the operating principles of building systems available in hospitals, students are required to brainstorm and suggest innovative ideas on how to reduce energy consumption based on tips and hints provided by the instructor and specialized consultants in the field of energy. Students achievement in this project was obtained, through their academic supervisor, their energy consultants, their community partners (hospital personnel), and students reflection on their experience. This paper presents qualitative analysis of integrating service learning and civic engagement in this course, explained the benefits, challenges, and recommendations for future implementation.

1. INTRODUCTION

Service learning is a type of active, experiential learning that blends the experience of working with and serving the community [1, 2], learning and understanding of course materials, and gaining valuable experience related to future career. When students participate in service activities, they meet identified community needs, and they enhance their sense of responsibility towards their community [3, 4]. Research in this field showed that service learning has positive impacts on students’ academic [5, 6], personal [2], social [1, 2, 5], and citizenship [1, 5, 7, 8] outcomes.

Service learning, nowadays, is gaining a considerable attention in higher education institutions due to, the increase number of students enrolling in colleges and universities, changes in competences, skills and abilities needed by the market, and the demand on higher education for greater accountability [9]. These factors push institutions of higher education to consider service learning as a powerful educational tool and integrate it in teaching subjects in a variety of disciplines such as business and management [10], science and environment [11], and engineering [12, 13]. However, service learning has been overlooked as a teaching strategy at Jordanian universities. This is mainly due to the dominance of concept of practical training at the final year of the study period. This pushes students to put all what they have learnt into practice without any responsibility towards the needs of the community they live in.

The Hashemite University has been recently granted a fund from the TEMPUS to enhance learning outcomes of

undergraduate student by implementing service learning and civic engagement through curriculum. The project entitled TAWASOL (which means “connection” in the Arabic language) aims at supporting the creation of effective cross-curricula service learning and civic engagement in Jordan and Lebanon through utilizing the expertise and resources of each of the partner universities from Europe.

The current study reports an experiment of implementing service learning and civic engagement in Mechatronics Engineering course in the Hashemite University as a response of TAWASOL project. Specifically, this study explores students’ perceptions about the service experience in relation to their sense of connection to their group and university, their sense of responsibility towards their community, and their sense of personal and professional growth.

2. METHODS

2.1 Participants

Participants were 23 senior Mechatronics Engineering students (3 females and 18 males) aged 21-23 years. All participants were enrolled in a special topic course entitled “Building Automation”.

2.2 Integrated Service Learning

Service learning was integrated into a course based on Jeffrey Howard’s model [14]. This model indicates that community service experiences must be relevant to the academic course of study and emphasizes the integration of both experiential and academic learning where each one of them works to strengthen the other [14].

2.3 Integrated Service Learning

The course was delivered into the following methods:

- ❖ Regular lectures by the course instructor: The instructor explained the following topics
 - Introduction to building automation.
 - HVAC systems.
 - Lighting systems.
 - Fire alarm systems.
 - Video Surveillance systems.
 - Voice-Data-Video systems.
 - Access control systems.
 - Data Networks and networks integration.