

Work in Progress - Design and Creation of Longitudinal Assessment Study on the Effectiveness of Engagement

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Abstract - An emphasis of Western Kentucky University is student engagement which is defined in a variety of ways by different groups across campus. The Department of Engineering at WKU is home to three ABET accredited program that have missions of project-based engineering education. The three programs in the department; civil engineering, electrical engineering, and mechanical engineering; have created individual assessment programs in order to continuously improve the programs. Project courses and design experiences play an integral role in the delivery of the project based courses at WKU. The mission of Western Kentucky University Electrical Engineering (EE) Program is to produce graduates who have been engaged in a variety of project experiences throughout the curriculum. In the Western Kentucky University EE program, student engagement is achieved through project-based activities. The objective of this project is to develop a longitudinal study that will examine the effectiveness of engagement through the project based curriculum. An important question to be answered is whether or not project based engineering is effective in student learning. Through the results of this study, it is hoped that student learning through projects will be improved.

Index Terms – Assessment, Engagement, NSSE, Project-Based Education

OBJECTIVE OF WORK

Western Kentucky University (WKU) University prides itself in engaging students across the campus. WKU has developed a Quality Enhancement Plan which states that

“Students will engage with communities other than their own in purposeful learning activities that explicitly address their capacity and responsibility to contribute to community and society.” [1]

Each department across the campus has developed venues for engaging students. One method that the university uses to measure engagement is through the National Survey of Student Engagement (NSSE) which is administered to each freshmen and senior student.

The mission of the EE program is to build a foundation of knowledge in electrical engineering by integrating a variety of project experiences at every level throughout the curriculum[2]. The mission statement and desired qualities of graduates of the EE program directly support the ABET Criteria 3 A-K [3]. Throughout the curriculum, EE students are provided many opportunities to grow in the various roles of engineers.

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PREVIOUS WORK

Previous work has been done on the correlation between faculty perception of student engagement, student assessment, program outcomes and objectives, and student grade point average. The results from these studies will be used to aid in the design of this study.

A study was done to determine the engagement of students in the EE program. Two groups of seniors were ranked by program faculty on objectives, outcomes, and engagement in projects. The students were separated into thirds (top, middle, and bottom). The students also self assessed themselves using the NSSE. Students were ranked by faculty on their level of engagement in projects, program outcomes, and program objectives. During the study the following results were found [4]:

- The faculty perceived that an engaged student fulfilled the program objectives.
- The faculty perceived that engaged students met the program outcomes and the ABET Criteria 3 A-K.
- There was a very high correlation between faculty perception of student competency in program outcomes and faculty perception of student competency in objectives.
- There was a high correlation between faculty perception of student competency in program objectives and outcomes with student GPA.
- Faculty and student perceptions of outcomes and objectives were different.

- Student GPA was not a good indicator of student engagement.
- There was some correlation between student self-assessment and faculty assessment of student engagement.

One method used by the university to measure engagement is the NSSE which is administered to each freshman and senior student. The NSSE instrument is essentially a series of questions created to determine student perception of their engagement during their higher education experience. NSSE is described as a method for determining “level of academic challenge, active and collaborative learning, student-faculty interactions, enriching educational experiences, and supportive campus environment [5].” The NSSE instrument poses questions that allow students to rate themselves on activities that relate to the specific academic program, the resources that the university offers, and other activities present on campus [5]. The NSSE responses for these students on a select set of questions which support ABET Criteria 3 A-K was examined for correlation with the program outcomes, program objectives, and student engagement. The results from the NSSE survey did not appear to be a strong indicator of student performance on the program objectives and outcomes of the EE program [4].

Another study has been completed in which a simple algorithm was developed as a predictor for student engagement based on faculty perception of student engagement, student participation in engineering activities, and student self assessment. It was determined that a student who is engaged through the engagement algorithm also satisfies the mission of the program and ultimately the assessment plan for the program [6].

PROJECT ACTIVITIES

The goal of this project is to create a longitudinal study which tracks a group of freshmen electrical engineering students through their academic careers as EE students. The success of the students will be tracked with an emphasis on the effect of engagement on their success. Specifically, the role of projects in student success will be examined. A longitudinal study of developing engineers will be designed and planned during the project. A longitudinal study of developing engineers has been designed and planned. The project activities will include following:

- Collecting background material such as high school grade point average, ACT scores, pre-college mathematics and science preparation, and the mathematics class taken during the first semester of the engineering for each of the student in the cohort.
- Developing a schedule for assessment and preparation of assessment instruments if other than the current assessment instruments in use. The WKU EE program current uses a variety of instruments to assess their students such as rubrics, self-assessment surveys, FE scores, etc. The assessment team must determine if

these instruments will provide adequate data for this study and if not develop new tools. A four year schedule of assessment data collection must be prepared before the study begins.

- Implementing existing ABET assessment plan into the study. It is imperative that faculty minimize their effort while maximizing their assessment results. This is true for this study also and an attempt will be made to incorporate the existing assessment tools into this study.
- Linking the results to expectations from engagement. The WKU EE program has a mission of project based education which supports the university mission of study engagement. The outcomes of this study should be linked back to student engagement to verify the effectiveness on student success.

The study will be supportive the WKU Quality Enhancement Plan. The effectiveness of the National Survey of Student Engagement (NSSE) data for this cohort will also be studied to determine if the NSSE results support assessment of projects.

REFERENCES

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