

Employability of Agricultural Engineering Graduates from the College of Engineering and Agro-industrial Technology, University of the Philippines Los Baños

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Abstract

The Master of Science in Agricultural Engineering (MSAE) and Doctor of Philosophy in Agricultural Engineering (PhDAE) curricular programs of UPLB-College of Engineering and Agro-industrial Technology (CEAT) were assessed through determining the employability of the graduates from Class of 2010 to Class of 2020. Using the general systems theory perspective, both quantitative and qualitative analysis were conducted through a non-experimental, self-administered online survey. This is to determine the competencies developed by the AE graduates through their programs and its relevance to their current jobs. The profile of the respondents showed a relatively high attraction of AE programs from different areas in the Philippines. There is high employment rate of the AE graduates at 93.1%. Majority were employed within 6 months after graduation, mostly working in the academe as faculty members, researchers, engineers, and project staff. This signifies their marketability due to the trainings and competencies acquired during graduate study. AE graduates acknowledged that they have developed values and skills that proved useful in their current jobs. Values developed were Competence (86.21%), followed by Confidence (82.76%), and Diligence and Commitment (both with 77.59%). Some respondents also developed Patience, Integrity, and Excellence, which they listed as among other values. Evaluating the AE graduate curricular programs through the employability of the graduates shows that the feedback of an organization's output (graduates) is important in improving and strengthening an institution's educational system and services. Recommendations and suggestions to improve the curriculum can be made based on the needs and demands of the respondents accordingly.

Keywords: agricultural engineering, graduate program, employability, general systems theory

Introduction

Engineering has a significant role in facing and solving challenges such as affordable health care, issues of energy, transportation and climate change, access to information, disaster mitigation and environmental protection, among numerous others. The role of engineering in our society is vital as the world continues to develop and it is important that we take the full measure of engineering's capacity to make a difference in the developing world [1].

The UPLB College of Engineering and Agro-industrial Technology (CEAT) was one of the first colleges to step up in revising and developing new strategies and methods in its engineering degree programs. Before, its Bachelor of Science in Agricultural and Biosystems Engineering program (BSABE) is a 5 year curriculum with an option of Thesis or Internship meanwhile its Master of Science and PhD in Agricultural Engineering are offered for two and three years, respectively. In 2018, with the full incorporation of Outcome-Based Education (OBE) Curriculum and in realignment with the K-12 program of the Basic Education, the BSABE

was changed into a 4 year program with addition of Technopreneurship and Innovationeering courses and Engineering Industry Research/Internship. However, its MS and PhD programs have no changes at all. Therefore, to continue delivering quality education and to maintain global competence, a review of CEAT's AE graduate programs is very much needed.

This study was conducted to assess the relevance and effectiveness of the UPLB-CEAT's MSAE and PhDAE curricular programs through tracing its graduates from Class of 2010 to Class of 2020. Specifically, it aimed to determine the employability conditions of the MSAE and PhDAE graduates through a non-experimental, self-administered online survey, assess the curricula based on its strengths and weaknesses as perceived by the alumni using the General Systems Theory, and recommend strategies to improve the graduate Agricultural Engineering programs.

Related Work

The acceleration of technological changes and development in the 21st century brought challenges and opportunities that have changed the role of engineering in the society and the engineering practice in general [2]. These changes were also introduced by the integration, international accreditation, and globalization of the Association of Southeast Asian Nation (ASEAN) [3].

Quality higher education can be translated into employment, efficiency, and productivity and these elements can drive sustainable economies and desirable social transformations [4]. Employability skill is the most required skill besides technical knowledge in the 21st century to compete for employment and sustain jobs in the industrial global market[5]. Hence, the engineering education is facing the challenge of producing competent engineers who are ready to meet the ever-changing demands of the 21st century [2].

The Commission on Higher Education (CHED) requires all HEIs to conduct a tracer study for the continuous improvement of academic curricula and learning materials. Moreover, it is one of the required documents of accrediting bodies such as the ASEAN University Network-Quality Assurance (AUN-QA) and Washington Accord, among others.

UPLB-CEAT as Center of Excellence by CHED and an AUN-QA certified institution is mandated to propagate appreciation for the agricultural engineering field and to enhance teaching, research, and service programs to further nation-building and national development. Hence, it is important that the graduate curricular programs of the college will continue these mandates to sustain excellence up to the post-graduate studies of the students. Moreover, with employability as one of the major drivers of global economy [7], a tracer study on the employability of the MSAE and PhDAE graduates may yield important insights in this regard.

Methodology

This descriptive study used a standardized survey, specifically a non-experimental, self-administered web survey research through online questionnaire design. The survey questionnaire was adopted [6] and revised in accordance with what is applicable to the MS and PhDAE graduates of UPLB-CEAT. It was transformed into an online survey through Google Forms for easier data gathering and to follow the COVID-19 pandemic guidelines. The generated link was sent through the email of target participants and was posted to the social media accounts of the college for 39 days.

A combination of quantitative (frequency tables and Likert Scale) and qualitative research (descriptive-thematic analysis) approaches was employed in this study. Moreover, to assess the feedback of the alumni, the study used the General Systems Theory, specifically the Input-Process-Output-Feedback model of Bertalanffy [8].

Results and Discussion

From the 122 target respondents (95 MS and 27 PhD), 58 alumni (47.54%) answered the tracer study. From this, it can be observed that there are more male respondents (55.17%) than female (45.83%) which follows the observation of UNESCO [1] that the attraction of men to Science & Technology courses such as Engineering is higher compared to women. However, there is no sufficient evidence that there are more male graduates than female in the AE graduate programs of UPLB-CEAT since the graduation data given by the UPLB Graduate School is generalized by semester.

Meanwhile, majority of the respondents during the conduct of the study are relatively young with 18 respondents aging 24-29 years old and 24 aging 30-35 years old. Fifty percent (50%) of them are married while 48% are single. We can assume that during their graduate study, the married ones are still single. Therefore, the result gives the impression that people tend to pursue higher education while they are young and newly graduated from college. The recent graduates of the program are easier to contact and have a higher response rate than older graduates. It was also reflected in the number of respondents coming from the classes of 2020, 2019 and 2018.

Majority (93.10%) of the respondents have been employed after graduation (see Fig. 1). In less than 6 months, 28 out of 58 (48.28%) were able to land their first job after graduation. Meanwhile, 15 of them (25.85%) were already employed while studying or on study leave. This shows that agricultural engineering graduates can find a job within a short period of time. The result shows similarity with the studies of Laguador and Datong [9] and of Aguilar [10] for the Computer Engineering graduates in LPU-Batangas which also generated high employability rate and graduates who were employed one to six months after graduation.

Most of them (75.86%) have permanent/regular/full-time statuses and are working in the academe and govt institutions as faculty (68.97%) while others work as researchers/extensionists, engineers, managers/directors, and project staff. It can be observed that majority of the respondents are working in the field where postgraduate studies is a requirement for promotion and career development, especially in the academe.

The study also shows that the graduates have developed values and learned important skills during their graduate program that they have found useful in their workplace. *Research, Critical Thinking and Problem Solving* were cited as the most useful skills and were found to significantly contribute to the fulfillment of the professions of the respondents. These are also useful since most universities are requiring publications in the call for promotion, hence research has become an essential skill in the creation of project and program proposals. Meanwhile, *entrepreneurship* is also cited as a useful skill. However, only few has delved into forming a business of their own; therefore, it is a rising challenge and opportunity for the improvement of the MS and PhDAE curricula.

On the other hand, the graduates stated that they have developed important values during their graduate study such as competence and confidence among others. Overall, respondents found their AE graduate program in their current job as "Extremely Useful" with mode value of 1 or the most common value answered by 65.52% of the respondents. Meanwhile, the Standard Deviation computed is 1.64 which means that the participants assessment in the usefulness of their graduate program in the workplace lies between Extremely Useful and Very Useful.

The Input-Process-Output-Feedback model[8] was used to assess the MSAE and PhDAE curricula based on the comments of the graduates. The college imports continual *input* from the demands and needs of the society specifically the Agricultural Engineering students and industry. With the resources and support from

the UPLB administration, CEAT transforms and incorporates the demands and needs in the course topics of the curricula and adjust the way of teaching of the faculty and services of the staff in accordance with the expectations of the society. Right now, the challenge in the *process* is the revision of the curricula to meet 21st century. The value-added *output* of the college, the graduates, will then become the new input of the organization where they will be part of during employment.

Through the tracer study, the college was able to gather *feedbacks* from the graduates to continue the cycle and to begin a new process. The feedbacks from the alumni and employers are helpful in creating a proposed plan to further improve the curriculums of CEAT MSAE and PhDAE programs. The perceived strengths of the program that are found useful in their jobs such as (a) Holistic and Interdisciplinary curriculum, (b) reliable, competent, and experienced faculty, (c) strong research and technopreneurship foundation, (d) hands on application of all laboratory activities, and (e) linkages or consortium with national institutions, should all be continuously improved and upgraded. The comments of the respondents (alumni and employers) also generalized that a major curriculum revision was recommended which also covers improvement in laboratory facilities and strengthening of national and international linkages. Meanwhile,

Conclusion

The mission of UPLB College of Engineering and Agro-industrial Technology is to produce engineers with the highest technical capabilities, entrepreneurial and networking skills. Therefore, based on the result, we can assume that UPLB-CEAT has met the demands of the 21st century through giving quality higher engineering education. However, since there are perceived weaknesses and challenges arising in its MSAE curriculum, recommendations for improvement should be considered. The conclusions drawn from these findings were: (1) the employability rate of the alumni signifies the marketability of ABE graduates of CEAT with the trainings and competencies acquired during their graduate program; (2) the AE graduate program has helped with the employability of the graduates; and (3) evaluating the AE graduate curriculums through the employability of the graduates shows that the feedback of an organization's output (graduates) is important in improving and strengthening an institution's educational system and services. Thus, we can make recommendations and suggestions to improve the curriculum based on the needs and demands of the respondents accordingly.

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