Service Learning Experiences From The Lens Of Student Outcomes And Willingness Of Engineering Students Community Involvement

Jake M. Laguador, Nemy H. Chavez

Abstract: Students find it hard to engage themselves in the community activities due to some factors related to their academics, personal and social life in college. Measuring the student outcomes from the service learning experiences could help the institution in assessing the relevance of curriculum with some student activities. This study aims to describe the learning experiences of engineering students from their community involvement based on the selected student outcomes in terms of cognitive, affective and psychomotor domains of learning. Descriptive type of research was utilized in the study with 102 engineering students served as participants. Result showed that two (2) in every five (5) engineering students have average to high level of interest to participate in the community extension related activities. But they are willing to join primarily if they have free time together with their friends and classmates and if there will be additional points for their academic performance. Academic aspect is a major reason for students why most of them could not be able to join the community extension activities. Male engineering students have significantly higher learning experiences as defined in their student outcomes in developing their ability to function on multi-disciplinary teams, ability to communicate effectively and having broad education to offer solutions for challenging issues of the society. Result also showed that those students who are not excited to participate and not confident to join with the group are most likely those with lower level of interest to join the community extension activities.

Index Terms: academic aspect, community service, learning experience, multidisciplinary team, student outcomes

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1. INTRODUCTION

Limited exposure in the community activities of students has always been a challenge among institutions of higher learning. It hinders the opportunity for the students to see the issues that the society needs to address. They need to understand that the focus of their degree programs is not only pure academics but also they need to understand how to appreciate the value of volunteerism. Community involvement through extension service has been integrated in the curriculum in the baccalaureate degree of other institutions in the Philippines but not all have directly specified it as a separate course in the curriculum. Students need to have comprehension on how they can contribute to the development of the community where they belong at the end of their undergraduate programs. It is the responsibility of the Higher Education Institutions to develop the knowledge, skills and character of the students to make a difference on the lives of the community. But the problems exist on the way students respond and appreciate the value of community projects in terms of their interest and willingness to participate in the college and institutional extension activities. There are some studies conducted regarding the benefits of extension projects to the service providers like for students but not dealing specifically describing the engineering student outcomes. Laguador and Camello [1] emphasized the difference between the classrooms and communities where students can explore to deepen and strengthen their learning experiences towards the achievement of their potentials as future leaders and professionals. Jenkins and Sheehey [2] noted that students were given the opportunity to practice and enhance their critical thinking skills while addressing the authentic needs and real world problems of the communities through service learning. Applying their knowledge in real-world settings

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provides deeper understanding of the challenges to communicate successfully in acquiring and exercising new skills. The term extension service is being used by most colleges and universities in the Philippines which means outreach or sustainable projects and programs extended to the adopted communities which serve as corporate social responsibility of the HEIs through the assistance of employees and students. Other terms like service-learning, community service, volunteerism, field education, and internship [3] are some of related activities in performing service that can be associated which describes specific set of objectives with the end goal of uplifting the quality of life in the community. Service learning is the main focus of this study where the implementation is considered challenging in the light of issues such as changes in student demographics at the end of every semester or school year and the pressure from existing goals of the curricula.

However, closer community engagement is increasingly important in the long-term goals of the universities [4]. Service Learning (SL) is a proposal which emerges from the volunteer service to the community and from skills acquisition, combining them in a single articulated project [5]. HEIs provide intentional learning activities which integrate community service with student involvement as part of the program educational objectives where the adopted community and the host educational institution worked together towards a mutually beneficial outcome [6]. There is a potential to transform generation and the society through carefully implemented service-learning experiences [7]. Academic institutions believed that service learning courses enhance the student learning while serving the wider community [8]. Even though the present study is about community involvement and not engagement, it tries to measure the relevance of the community projects to the attainment of student outcomes through service learning experiences. Community involvement on this study is based on the perspective of the service provider in the case of the students as participants of community projects and activities. It refers to the level of willingness of students to participate in assisting the university to execute plans for community development. The concept of

the community engagement is used in other studies to connect the university expertise to the needs of specific stakeholders. There are some studies that used the term civic engagement, while others used the concept of community engagement or community involvement. Involvement is doing the projects to the community while engagement is doing the project with the community. It is more appropriate for this study to use the concept of community involvement because community engagement has a deeper meaning or attachment between the service providers and beneficiaries of the extension projects. But in the case of the students, since they are just considered participants who provide assistance to the teachers in the execution of community projects, it is proper to use community involvement. Service-learning pedagogy has theoretical underpinning in experiential learning [9], [10], [11]. Building on the foundational works of Kurt Lewin, John Dewey and others, experiential learning theory offers a dynamic theory based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction [12]. Service learning (SL) is a type of experiential learning in which students apply their knowledge and skills to solve problems in the community, often working collaboratively with others as a team [10]. Exposing the engineering students to various extension services would provide greater opportunity for the learners to see the situation outside the four walls of the classrooms in order for them to be conscious of what is happening around them and what could be their possible contribution to help other people. Blomstrom and Tam [9] noted that service-learning is a relatively common pedagogy in engineering. Laguador and Chavez [14] found out that the Engineering students with higher level of perseverance and sense of responsibility have also higher perceptions on the impact of community extension projects to their personal values. These kinds of activities might have an indirect effect to their academic performance but still this is an important part of developing the affective domain of learning. The study would like to answer how the institution of higher learning could link the community extension programs to the engineering student outcomes throughout the entire years of staying in college. Extension is an important component in the responsibility and function of HEIs in the Philippines. It serves as the Corporate Social Responsibility (CSR) of the HEIs through the participation of employees as well as the students. Since extension is one of the trifold functions of the HEI, the school administrators need to identify the factors that serve as possible barriers encountered by the students. This study would like to find out some possible challenges faced by the engineering students that hinder them in joining community related activities. The investigation focuses on academic, personal and social aspects of being students of engineering programs. The University is very particular in the number of students who joined the community extension activities. It is quite challenging since the University is promoting the sense of volunteerism among the students through encouraging them to participate in the community projects, but students have the option not to join if they are not interested. Giving service to the community has always been considered a great opportunity to demonstrate one's generosity by sharing the time and any available resources that someone can contribute to the welfare of humanity. Learning takes place anywhere and anytime within and even beyond one's control, as long as the experiences are externalized and aligned with the objectives and outcomes of the program, the involvement of the students will remain meaningful and long-lasting. Students are taught how to be sensitive to the needs of the society. It is one way of opening their minds and hearts to the reality of life that not all people had been blessed with material things and fighting spirit. The hope and joy that community service can bring to the helpless is a spark of light that the students and the university can provide to the hopeless. Community service has been described by Lim [13] as "services which are identified by an institution of higher education, through formal or informal consultation with local non-profit, governmental, and community-based organizations, as designed to improve the quality of life for community residents, particularly low-income individuals, or to solve particular problems related to their needs". Laguador and Chavez [14] noted that "developing a community with utmost necessity to get some assistance from different agencies like academic institutions is an act of fulfilling the mission of helping people to uplift not only the standards of living of those underprivileged but it would also provide greater impact to the character and values of the students and employees who take part on this worthy undertaking". However, according to Mitchell [7], care and consciousness from the students are important aspects in drawing attention to root causes of social problems. Without these, service-learning may have no impact beyond students' good feelings. Students in general indicated existence of intention to do communal service voluntarily but they are more prone to do such activities due to the requirement of the college and the need to fulfill the credit hour [15]. This study was anchored in the Three domains of learning which include the concept of cognitive domain from Benjamin Bloom [16] as revised by Anderson and Krathwohl's Taxonomy in 2001, Affective domain from David Krathwohl [17], and Psychomotor domain from Anita Harrow [18] in relation to the the Engineering student outcomes which bring the holistic development of the students to prepare them in various fields of work that will contribute in nurturing the community and the engineering profession as discipline. These five (5) student outcomes were identified from the ABET Engineering Criteria [19] and selected based on its possible relevance to service learning. These student outcomes include the ability to function on multi-disciplinary teams; understanding of professional and ethical responsibility; ability to communicate effectively; broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context; recognition of the need for, and an ability to engage in life-long learning; and knowledge of contemporary issues. The widespread understanding of service-learning as being defined in terms of three categories of student learning outcomes—academic, societal/civic, and personal—provides a useful organizing framework for sorting through and determining the most appropriate outcomes in any given situation [6]. These student learning outcomes can also be considered as variable to describe the barriers for student engagement in community projects. There are personal aspects that can be contributed to lack of community involvement of students and lack of interest, motivation, awareness, familiarity and confidence. The study explored on how community involvement of the engineering students could contribute to their holistic development from service learning experiences within the extra-curricular activities. Engineering degree program is considered as a hard science where students are being encouraged to prioritize their studies rather than attending some other school activities.

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The challenge of having enrolled in a very demanding degree program is considered a given fact for engineering students to manage their schedule to respond in other school responsibilities that require them to participate. This study seeks to provide a better way to understand the level of willingness of the engineering students to participate in the community extension projects. Community involvement is measured through student outcomes aligned with the three domains of learning. The findings of the study served as input to proposed strategies focusing on the holistic development of the students in terms of personal, academic and social aspects. This will also contribute in the assessment of outcome-based education implementation where the student outcomes in relation to social responsibility of the engineering programs are measured for continuous improvement.

2 OBJECTIVES OF THE STUDY

This study aimed to determine the sex and level of interest and willingness of engineering students to participate in the community extension activities; to determine the level of learning experiences of engineering students from their community involvement based on the selected student outcomes in terms of the three domains of learning: cognitive, affective and psychomotor; identify the barriers encountered by the students to join the community extension activities in terms of personal, academic and social aspects; test the difference on the learning experiences when grouped according to sex and interest; test the significant relationship between the learning experiences and attainment of student outcomes.

3 METHODS

3.1 Research Design
The researchers utilized the quantitative-descriptive method to determine certain condition or phenomenon that is common to the subjects under study.

3.2 Participants
Second year to fifth year engineering students across all four programs who have participated in at least one extension program of the College of Engineering or a project initiated by the University were considered as respondents of the study. There were 120 identified students but only 102 or 85 percent of them answered willingly and voluntarily in the administered survey.

3.3 Instrument
The survey questionnaire used was modified from the instrument of Pesigan [20] in terms of willingness to participate in community extension towards community involvement and barriers encountered in the community services. The set of instrument was content validated by experts in community extension and tested its reliability with the result of Cronbach's alpha value of 0.926 which obtained a very good internal consistency. Meanwhile, the instrument to determine the service learning experiences based from the student outcomes of engineering was also content validated by experts in outcome-based education and also tested its reliability by pilot testing the instrument to 30 engineering students from other institutions. The resulting Cronbach's alpha value of 0.844 signifies that the instrument is valid with good internal consistency.

3.4 Procedure and Ethical Consideration
The questionnaires were administered using Google Forms for easy distribution and retrieval. Identified students who were willing to participate in the survey were given the link of the survey through the Facebook Accounts. On the other hand, some questionnaires were also personally distributed to the students. One-on-one interview to ten (10) students was conducted one week after answering the questionnaire to validate the result of the survey. Before the administration of the questionnaires, the respondents were informed regarding the intention of the study and ensured the data provided in the questionnaire will be treated with utmost confidentiality and will be used solely for the purpose of this study. Participation of the students in the survey is pure voluntary and those who signified their intention to participate are aware of their rights to stop participating even in the middle of the survey.

3.5 Data Analysis
Frequency count, Percentage, ranking and weighted mean were the statistical tools used to describe the profile and the level of service learning experiences of the students while T-test and Analysis of Variance (ANOVA) were used to test the differences when the respondents are grouped according to profile variables because the nature of the data is considered normally distributed. The given scale was used to interpret the result of the data gathered: 1.00-1.49: Strong Disagree (SD); 1.50-2.49: Disagree (D); 2.50-3.49: Agree (A); 3.50-4.00: Strongly Agree (SA).

4 RESULTS AND DISCUSSION

Table 1. *Profile of the respondents in terms of Sex and Level of interest to participate in community extension activities*

Profile	Category	Frequency	Percent
Sex	Male	73	71.6
	Female	29	28.4
Interest	Very Low	12	11.8
	Low	23	22.5
	High	34	33.3
	Very High	33	32.4

Table 1 presents the profile of the respondents in terms of sex and the level of interest to participate in community extension activities. Result showed that 71.6 percent or 73 engineering students are males against 29 or 28.4 percent of females. Meanwhile, 33.3 percent of the engineering students have high level of interest to join the community extension activities followed by the 32.4 percent of them with very high interest. This signifies that there are at least seven (7) in every ten (10) engineering students who are willing to participate which is considered a substantial number according to those surveyed students with at least one community extension participation while there are three (3) in every ten (10) who are not really interested to join the extension activities. It gives an idea based on the result that even those who already participated in the extension projects have still low level of interest of joining extension activities. Table 2 presents the participated Community Extension projects of Engineering Students. Result showed that most of them (87.3%) have attended outreach programs like Christmas gift giving and donation drives for victims of fire and natural calamities while 72.5 percent of them have already participated in the Math Tutorial because students across all engineering programs were

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specifically assigned by the community extension coordinator who will be attending in the session with the intermediate pupils in the adopted elementary school near the campus which is an activity being done all year round.

Table 2. *Participated Community Extension Projects of Engineering Students*

Interest	Frequency	Percent
Basic AutoCAD Course	21	20.5
Basic Electronic Course	17	16.7
Basic Welding Course	23	22.5
Math Tutorial	74	72.5
Outreach Programs	89	87.3

Note: Multiple Response

Meanwhile, least attendance of students goes to project specific to discipline like AutoCAD which is only being attended by the Computer Engineering students (20.5%) while Basic Welding course is being attended by Industrial and Mechanical Engineering students (22.5%) and the Basic Electronics Course is being attended by Electronics Engineering students (16.7%).Attendance to these community extension projects is supposedly voluntary but engineering students are being required by the faculty advisers to participate as part of their class performance supported by the reflective essay. Students facilitate these basic courses together with their faculty advisers and community extension coordinator in giving lectures and hands-on experiences with the beneficiaries. Students could not be able to visit these beneficiaries from their respective residences because the courses are being held inside the university.

Table 3. *Willingness to Participate in Community Extension*

I'm willing to participate in the community extension because	Average Rank	Rank
I have no assignments or other academic activities to complete	2.147	7
I have free time	1.676	1
I want to experience the feeling with the community	2.167	8
I am being required by my teacher	2.049	5
I want to fulfill the responsibility of a student – volunteer	2.088	6
I will be given extra points in my grades or academic performance	1.882	3
I'm interested in type of program or project	2.186	9
I will be joining with my friends or classmates	1.833	2
I want to deal with people from all walks of life	1.971	4

Table 3 presents the willingness of the students to participate in the community extension activities. Engineering students are willing to participate in the community extension when they have free time (1.676) and when they will be joining with friends or classmates (1.833) and because they will be given extra points in their grades or academic performance (1.882) as the top three (3) responses for them to participate. They are aware that joining extension projects is voluntary and as much as possible it should be done outside their class schedule or during their free time so that instruction will not be sacrificed. But since students have different class schedules, it cannot be avoided but very seldom that the time of visit to the community is set when some of them have classes. The whole class will be joining in the community. Students find the activity enjoyable if they are working together with their friends and classmates. They were given the chance to do some outreach projects with students from other degree programs so that they can meet new acquaintances. They can perform the tasks cooperatively because they feel comfortable with friends working to achieve common goal.   It is not a good practice if the students will join the activity just because of additional points or grades in a quiz or major exam. However, according to them, that is one of the reasons that can convince them to participate more often. Hence, the essence of volunteerism is not anymore being exercised when it will happen. Teachers and community extension coordinators are very careful in disseminating information regarding the invitation to students to join in any extension activity. It should always be voluntary and there is no presence of pressure as much as possible in encouraging participation. Bickford and Reynolds [3] emphasized that students may be tempted to consider their service-learning or community service mere volunteerism if the learning takes a backseat to the service. As such, any assigned encounter should address methodology, or how students are to approach an unfamiliar community.

Table 4. *Barriers Encountered in Community Involvement with regard to Personal Aspect*

Personal Aspect	No (%)	Yes (%)	R
1. I'm not fully aware of the community projects of the college	52.0	48.0	4
2. I'm not excited to participate in the community extension activities	46.1	53.9	3
3. I'm not given a chance to participate	67.6	32.4	5
4. I have no proper orientation about what will happen in the community program	31.4	68.6	1
5. I'm not confident to join with the group for community projects	42.2	57.8	2
Mean	47.86	52.14	

Table 4 presents the barriers encountered in community involvement with regard to personal aspect. There is 68.6 percent of the students answered that they have no proper or formal orientation about what will happen in the community program and 48 percent of the students are not fully aware of the community projects of the college while 57.8 percent answered they are not confident to join with the group for community projects are some of the barriers in the community engagement of students. Lack of familiarity of the students in the college or institutional community projects affects the level of their confidence to make them feel comfortable with the group. Most especially for the first year students who had recently joined the community projects, proper orientation is always necessary to introduce with them the objective of their participation and what is expected of them to deliver. Since, they are still in the period of adjustment, knowing the environment is the first tendency of the students to learn from experience. There is a 53.9 percent of the students who are not excited to participate in the community extension activities. Students will never get excited to any activity if they are not fully aware of what will happen and what is expected to happen. Maul-Smith (2009) attested that there are still some students who are excited to experience new things they never did in the past. They consider this experience as something strange and adventurous. Overall, there are more engineering students who answered yes (52.4%) and considered personal aspect as barrier in their community involvement while 47.86 percent of them answered No on this aspect. Therefore, personal aspect as barrier is experienced by half of the

population who were included in the survey but not included to these the students who are not yet actively joining the extension activities of the institution and college.

Table 5. *Barriers Encountered in Community Engagement with regard to Academic Aspect*

Academic	No (%)	Yes (%)	R
6. Lack of time due to subject requirements	28.4	71.6	2
7. It is not part of the subject/course requirements	27.5	72.5	1
8. I find it irrelevant to my degree program	60.8	39.2	3
Mean	38.9	61.1	

Table 5 presents the barriers encountered in community involvement with regard to academic aspect. It is well understood that extension activities are being done outside the academic or course requirements of the program though it is part of the trifold function of any higher education institution. Ordinary students without any goal than to finish schooling and no more, no less would have a second thought of joining extension projects which are not part of any course requirements. They will start questioning for the purpose of such activities. If they never realize its value, they will never appreciate the remarkable and notable goal of community extension. Lack of time serves as one of the barriers for student participation due to subject requirements. It is the major priority of the students to accomplish first their assignments, take home activities and research projects than to join other extra-curricular activities like extension projects. They prefer to stay in the library after class or go home instead because of the long distance travel. Most especially to engineering students where they were given lots of complex problem solving in mathematics and other basic engineering courses. Students can surely join if the activity is scheduled within class hours like the whole class will be visiting the adopted community for certain outreach program. Students find it not part of the subject requirements, but they consider the nature and goal of the extension projects as relevant to their degree program. The engineering department offers training courses during summer to the adopted community such as basic AutoCAD, Electronics and Welding Courses. It also provides Math Tutorial project to elementary pupils. These projects are also part of their professional courses where their knowledge and acquired skills are shared during the training of the selected participants. From these, engineering students were asked to assist the participants during the conduct of the short training courses. They can share their skill in the aforementioned projects with an end goal of employment for the participants. There are three (3) in every five (5) students who believed that academic aspect is considered a barrier that affects their active participation in extension projects. Students could not able to devote much time for extension projects though majority of these are being held during summer time. But since they are also attending summer classes, they cannot balance the hectic schedule of classes during the term and the extension activities.

Table 6. *Barriers Encountered in Community Engagement with regard to Social Aspect*

Social Aspect	No (%)	Yes (%)	R
9. I am not a sociable person to join the community projects	50.0	50.0	1
10. I feel my presence is not important in the community activity	76.5	23.5	3
11. I find it difficult to bring my ideas with group for community projects	68.6	31.4	2
Mean	65.0	35.0	

Table 6 presents the barriers encountered in community involvement with regard to social aspect. There is a balance between the number of students who are sociable and not sociable as barrier to join community projects. There are some studies conducted that can show the overt personality of most engineering students. Since the participants of this study are just representative of the total population from one University, the share of 50-50 would be most likely possible. It is a good indication that even though 50 percent of the students are not sociable, they can still manage to join in some of the projects of the department.   However, there are 76.5 percent of the students who feel that their presence is not important in the community activities. This can be attributed to the students who joined only in the community outreach projects like gift giving during Christmas where they only serve as audience and they do not have direct or active participation. Meanwhile, one-third of the respondents find it difficult to bring ideas with the group for community projects. Most of the students who are not sociable based on interviews are also those students who could not able to express their thoughts to the group because they are not that confident with the idea and they have the feeling that this is not really significant. There is a clear distinction in the types of activities available to students at different points throughout the school day. This is of potential concern when one considers that students who are least proactive or inclined to participate in community engagement more broadly are also likely to be those least likely to participate in extra-curricular activities within their own school community [21]. Though, there are 65 percent of them who did not consider social aspect as barrier, there are still 35 percent who considered this aspect that can influence their involvement in community projects. It still gives an idea that one-third of those who already participated in the community extension have hesitation to become socially involved in activities outside academics.

Table 7. *Ability to function on multi-disciplinary teams*

Student Outcome #4	WM	VI	R
Learn the importance of meeting with different kinds of people	2.99	Agree	1
Respect the value of working with the team	2.94	Agree	2
Contribute in the implementation of any project as member or leader of a team	2.71	Agree	3
Mean	2.88	Agree	

Table 7 presents the student outcomes of community involvement regarding the ability to function on multi-disciplinary teams. There are 40.2 percent of the students who strongly agreed that they learn the importance of meeting with different kinds of people in the community. This could be associated with the future work environment of the students when they graduate. Multidisciplinary approach in a workplace is an important characteristic of engineers being considered by most industries. This is in preparation of the students to learn how to adjust and adapt in an environment with diverse cultural background and organizational hierarchy. Competition

is not being encouraged on the aspect of multidisciplinarity. Diversity in team encourages students to challenge themselves in order to improve the team's performance. Both accreditation requirements and global industry needs are pushing engineering programs to find creative means to include multidisciplinary (MD) team skills in their curricula [22]. Engineering students worked together with the faculty members as participants in providing extension projects to the adapted community. The learning experience of students on this aspect can be assessed through demonstrating their concern and respect for the needs of the people. Students learn how to demonstrate respect in people from all walks of life. They possess ethical and moral values that help them realized the importance of promoting human development. They also understand the co-existence of one another in an environment that needs to be developed and nurtured. Helping each other is one way of respecting and accepting the truth and necessity to be caring and collaborative with the team where Pierrakos et al. [23] gave importance to communication skills as vital component of project management and teamwork. The students get and give respect during the extension projects through their willingness to accept responsibility and perform necessary action to fulfill such obligation to the community they served. Respecting lives is also making sense and meaning to create powerful and healthy choices of changing lives through unity and cooperation. Students feel that they really belong as being included and valued in the team where they get and give respect as they work with the team. On that note, respect fosters individual engagement [24]. Engineering students believe that they can contribute something to the group from their active involvement in the implementation of the project as member or leader. It does not really matter to them if they act as member who provides assistance to the participants in the AutoCAD or welding courses. They take the responsibility as part of their learning experience in creating a deeper value of sharing their time and resources with the community. The implementation stage of the project requires deeper understanding of the goal, concept and purpose in order for the students and participants to realize its utility value [25]. It requires time for preparation, action, reflection and demonstration as the students create meaningful hands-on service learning experience.

Table 8. *Understanding of professional and ethical responsibility*

Student Outcome #6	WM	VI	R
Be proactive in promoting camaraderie to have a greater sense of responsibility	2.75	Agree	2
Pursue greater responsibility of my actions based on ethical and moral standard	2.34	Disagree	3
Practice certain level of leadership based on the core values of the university	2.90	Agree	1
Mean	2.67	Agree	

Table 8 presents the student outcome of community involvement on understanding of professional and ethical responsibility. The students have acquired certain level of leadership through taking greater responsibility and accountability in realizing the goal of the activity. Engineering students facilitate the Math tutorial among the selected intermediate pupils in one elementary school near the campus after attending classes. They are teaching basic math concepts based on the current lessons of the pupils as reinforcement program. From this, they can develop a sense of responsibility and be proactive in promoting camaraderie from maintaining rapport with the pupils considering the end view of enhancing the ability of the pupils in mathematics to become future engineers as well. This is parallel with Carrington [26] who focuses on developing proactive, socially responsible and democratic pre-service teachers to provide relevant learning experience of the community for their future roles. Only one-third of the respondents agreed that they understand ethical and moral standard as they go along with the activity by choosing the right words and behavior that can inspire and motivate the pupils to participate in the math tutorial sessions while 44.1 percent of them disagreed. Practicing professional and ethical responsibility is not yet definitely clear to them. During the interview, one student said that:

> "As students, we don't see ourselves performing such duties and obligations which we believed, we are not yet capable of doing higher responsibilities like taking care of the needs and concerns of the entire community."

Service-learning has been coupled with concepts of social justice, civic responsibility and ethical practice. It is conducted in the spirit of respect for community members and based on reciprocity and should be a reflective practice [26]. Meanwhile, students used certain techniques to boost the interest of the pupils to accomplish the math exercises before going home. They learned how to be proactive in creating value from their efforts to fulfill the mission of the project. They also practice certain level of leadership from conducting classes without the supervision of any faculty member from the college. They see the need of the community especially the pupils to develop more interest in treating math as an enjoyable subject rather than stressful. Table 9 presents the student outcomes of community involvement on the ability to communicate effectively. Students could be able to listen from the messages and stories of the people through informal conversations. It builds basic foundation of an informed community regarding life's conditions and quality of their well-being. They found it interesting to hear the narratives of people about struggles and challenges being faced everyday and happily go on with life full of hope and aspirations.

> "Community residents are very open to share their life experiences on how they faced and solved their problems. I saw their gratefulness with all the blessings they are continuously receiving from the service providers and praying that someday they can also return all the favors who help them in one way or another."

Table 9. *Ability to communicate effectively*

Student Outcome #7	WM	VI	R
Learn how to listen to the messages and stories of the people in the community	3.10	Agree	1

Express my appreciation of the people from the community through talking with them more often	2.99	Agree	2
Perform my ideas and use my acquired experiences with the situation in the community	2.89	Agree	3
Mean	2.99	Agree	

Students can express their appreciation with the community residents through making their efforts to reach out with these people and learn from them the virtue of determination and perseverance. Through constant communication with the people around the community, students learned many aspects of social behavior and the value of equality. They also learned how to give importance in the ideas of their classmates that contributed to the attainment of the objectives of their projects. Keshwani and Adams [27] emphasized that the engineering students had a variety of opportunities to practice communication skills through the project-based service-learning experience. The experience provided an opportunity to practice aligning technical content to meet the needs of an audience or specific community. Giving the chance for the students to perform their ideas on how to make the implementation of the projects more meaningful and successful is what the college proved to be effective. This is where the students can use their leaning experiences (2.89) and skills in assisting the participants in welding and AutoCAD courses as well as in Math Tutorial classes. They could be able to deliver and manage the projects even they are not yet part of its conceptualization because these projects had been doing by the engineering department for more than a decade. They could be able to communicate their ideas effectively through sharing their skills to the participants.

Table 10. *The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context*

Student Outcome #8	WM	VI	Rank
Think of strategies on how engineering can bring solutions to problem of the community	2.19	Disagree	3
Commit myself for bigger responsibilities to offer solutions in environmental and societal context.	2.33	Disagree	2
Join more extension activities where knowledge of engineering can be applied	3.03	Agree	1
Mean	2.52	Agree	

Table 10 presents the student outcome of community involvement on the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. They agreed that they will join more extension activities where knowledge of engineering can be applied (3.03) through welding, electronics and AutoCAD courses. But in the broader context of offering solutions to the community, students cannot really commit themselves for bigger responsibilities (2.33). They are quite not oriented about the rationale of having extension programs of the University, because what they are only aware of that they need to participate and attend on the outreach projects and watch the programs. Based on one interview:

"We were required to attend by our teacher to watch the Christmas gift-giving and participate in handing the gifts to the beneficiaries. Portion of these gifts are donated by the engineering students and we are glad to see people with smiles on their faces while receiving the small packs for their Noche Buena"

They are willing to join extension activities but they are still quite hesitant to think of strategies on how engineering can bring solutions to problem of the community (2.19). Students realize the immediate needs of the community on this context of sharing but they never thought on how to alleviate poverty as part of their contribution and responsibility of building sustainable communities in the future. Students need to learn how to see social problems where they can utilize the existing technology to help the community for any livelihood projects. Pierrakos et al. [23] emphasized that authentic, real-world problem solving is an integral part of the engineering profession. Yet, research suggests that engineering education is primarily focused on well-defined and well-structured problems, which do not provide students the real-world relevance, context, or experience in solving the types of problems required as a professional engineer.

Table 11. *Recognition of the need for, and an ability to engage in life-long learning*

Student Outcome #9	WM	VI	Rank
Increase my awareness about the situation of the local communities	3.53	Strongly Agree	1
Internalize similar community projects to continue this kind of activity after college	2.02	Disagree	3
Perform my duties as a student to learn more on how to develop community projects.	2.97	Agree	2
Mean	2.84	Agree	

Table 11 presents the student outcomes of community involvement on recognition of the need for, and an ability to engage in life-long learning. Three (3) engineering students in every five (5) strongly agreed that they have increased their awareness about the situation of the local communities (3.53) because of their active involvement in the extension services. During the interview, one student shared his reflection or realization of his present condition compared to the visited communities, he said that:

"Com Ex activities brought me to places where I met homeless people being taken cared of religious organization and private institution like LPU. This is also where I realized how lucky I am to have our own house though not can be considered a dream house but we are happy with the whole family living together."

Students recognized their duties to the community but knowing it is not enough without action. Almost one-third of the respondents disagreed about the idea of performing such duties of learning more about the community. They are quite hesitant to make some moves towards certain projects because it is still not clear to them the kind of activity to which the people will benefit from the proposal. Students are not also

involved in the community needs assessment that is why the history or background of the existing extension projects is not fully internalized. Ariely et al. [11] emphasized that it is important for class goals to allow students to select community partners and define their own project in a manner that is personally appealing for them.

Table 12. Knowledge of contemporary issues

Student Outcome #10	WM	VI	Rank
Identify and relate the national issues to the challenges faced by the community	2.11	Disagree	3
Be sensitive to the current needs of people in the community	3.14	Agree	1
Participate in other school or off-campus activities to discuss current issues in the community or country.	2.36	Disagree	2
Mean	2.54	Agree	

Table 12 presents the student outcome of community involvement on knowledge of contemporary issues. Being sensitive to the current needs of the people in the community (3.14) means knowing the challenging issues brought about by poverty and other economic crises. Most Filipinos are naturally responsive whenever natural calamities hit the country, various non-government organizations and even private and government academic institutions are contributing and donating some relief goods and other material things that can get rid of hunger and colds. Students are aware of the current scenarios and conditions of the people especially in the nearby communities because some of these affected residents are their classmates, schoolmates and friends. The sense of "malasakit" or concern with the community is evident from their actions of responding to the call for donations of the community extension office of the University and any government agencies like Red Cross. Majority of the engineering students or 65.5 percent of them do not participate in other school or off-campus activities to discuss current issues in the community or country (2.36). Engineering students were not used to join forums for them to speak out their ideas and opinions. It is the nature of these engineering students to be cooperative but they are working quietly and patiently.

Table 13. Difference on the Service Learning Experiences Based on Student Outcomes when Grouped According to Sex

Student Outcome	Male	Female	t-value	p-value
SO#4	2.98	2.62	3.347*	.001
SO#6	2.68	2.64	.337	.737
SO#7	3.07	2.80	2.323*	.022
SO#8	2.58	2.34	2.195*	.030
SO#9	2.89	2.71	1.955	.053
SO#10	2.72	2.84	-1.161	.248

*Significant at p-value<0.05

Table 13 reveals the difference on the service learning experiences based on student outcomes when grouped according to sex. There is a significant difference on the service learning experiences based on Student Outcomes when grouped according to sex as denoted by the computed p-values of less than 0.05 alpha level in Student Outcome # 4 (p<0.01); Student Outcome #7 (p<0.05); and Student Outcome #8 (p<0.05). Result showed that Male engineering students have significantly higher learning experiences in

developing their ability to function on multi-disciplinary teams, ability to communicate effectively and having broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. Result showed that male engineering students have deeper appreciation of the activities that helped them achieved certain student outcomes.

Table 14. Difference on the Barriers Encountered in Community Involvement in terms of Willingness to Participate in Com Ex Activities

Personal Aspect	Gamma Value	p-value
1. I'm not aware of the community projects of the college	.054	.723
2. I'm not excited to participate in the community extension activities	.896**	.000
3. I'm not given a chance to participate	.040	.805
4. I have no proper orientation about what will happen in the community program	.197	.229
5. I'm not confident to join with the group for community projects	.798**	.000
Academic Aspect		
6. Lack of time due to subject requirements	-.037	.816
7. It is not part of the subject/course requirements	-.050	.778
8. I find it irrelevant to my degree program	.953**	.000
Social		
1. I am not a sociable person to join the community projects	.087	.562
2. I feel my presence is not important in the community activity	.092	.621
3. I find it difficult to bring my ideas with group for community projects	-.074	.631

**Significant at p-value<0.01.

Table 14 presents the difference on the barriers encountered in community involvement in terms of willingness to participate in Com Ex activities. There is a significant difference on barriers encountered in terms of personal aspect. Result showed that those students who are not excited to participate in the community extension and those who are not confident to join with the group for community projects are most likely those with lower level of interest to join the community extension activities. The feeling of excitement of students to perform certain task is an important emotional state to give their best effort in making the activity memorable and meaningful not only for themselves but also to those who are involved in the activity. The level of interest of the students to participate defines the level of their excitement to see how they can share their time and energy to the needy.   Those who answered yes that they are not aware of the community projects of the college are not basically without interest to participate in the extension projects. Information dissemination is provided evenly across all degree programs and levels therefore, being aware of the projects does not mean they are already interested to join the extension projects and there are also students who are aware of it but some of them did not even care. This is the same with the one-third of the students who answered that they are not given a chance to participate but most of them are willing to join. Everyone is being given the chance to participate, but they only differ on the level of their involvement depending on the approved project of the college and the degree program in terms of its sustainability, complexity and extent of engagement needed from the

students. Almost seven (7) out of ten (10) of the students answered that they have no proper orientation about what will happen in the community program, even those students with higher level of interest in community extension have no proper orientation. Though there are many students who are still interested to join the extension program even though they were not fully informed of the details of the projects or certain outreach projects. In terms of academic aspect, students who find the community extension activities irrelevant to their degree program are those students with lower level of interest to join the com ex activities. If the rationale or main objectives of the community extension activities will not be discussed to students, they could not be able to realize the importance and relevance of their participation in the community development. Engineering students are not well-informed of their possible contribution through their active participation in the institutional and college based community activities. They have the tendency to rationalize and internalize the possible benefits they can get from the activity they will be joining in college in order to save their time and effort; this is if they can only appreciate the value and relevance of the activity to their degree programs and future career. Meanwhile, there is no significant difference on the level of interest of engineering students in joining the community extension projects in terms of social aspect as denoted by the computed p-values of greater than 0.05 alpha level. Engineering students have varying degrees of social characteristics where their ability to socialize with people in the community can be observed even the students have lower level of interest to join the community projects. They have the ability to adapt in certain situation without being influenced by their own interest towards the given circumstances.

Table 15. *Difference on the Student Outcomes when Grouped According to Level of Interest to Participate in Community Extension Activities*

Student Outcome	F	Sig.
Student Outcome #4	3.378*	.021
Student Outcome #6	2.225	.090
Student Outcome #7	7.471**	.000
Student Outcome #8	3.247*	.025
Student Outcome #9	0.399	.754
Student Outcome #10	11.951**	.000

*Significant at p-value<0.05; **Significant at p-value<0.01;

Table 15 reveals the difference on the Student Outcomes when grouped according to level of interest to participate in community extension activities. There are significant differences on the Student Outcomes when the respondents are grouped according to level of interest to participate in community extension activities as denoted by the computed p-values which are less than 0.05 alpha level. Result showed that those engineering students with higher interest of participating in community extension activities have significantly higher learning experiences in SO #4, #7, #8 and #10. However, there is no significant difference on the learning experiences in SO #6 and #9.

Table 16. *Comparison of Student Outcomes*

		t-value	Sig. (2-tailed)
Pair 1	SO 4 – SO 6	3.423**	.001
Pair 2	SO 4 - SO 7	-1.566	.120
Pair 3	SO 4 - SO 8	5.327**	.000
Pair 4	SO 4 - SO 9	.653	.515
Pair 5	SO 4 - SO 10	1.969*	.052
Pair 6	SO 6 - SO 7	-5.263**	.000
Pair 7	SO 6 - SO 8	2.298*	.024
Pair 8	SO 6 - SO 9	-3.023**	.003
Pair 9	SO 6 - SO 10	-1.396	.166
Pair 10	SO 7 - SO 8	6.483**	.000
Pair 11	SO 7 - SO 9	2.322*	.022
Pair 12	SO 7 - SO 10	3.988**	.000
Pair 13	SO 8 - SO 9	-4.875**	.000
Pair 14	SO 8 - SO 10	-4.028**	.000
Pair 15	SO 9 - SO 10	1.421	.158

*Significant at p-value<0.05; **Significant at p-value<0.05

There are significant differences when the Student Outcomes are paired to determine which Student Outcome is significantly higher than the other as shown in Table 16. Result showed that Student Outcome 4 is significantly higher than Student Outcomes 6, 8 and 10; while Student outcome 6 is significantly higher than Student Outcome 8 but significantly lower than Student Outcome 7 which is significantly higher than Student Outcomes 9 and 10. Overall, Student Outcome 7 obtained significantly higher rating compared to other SOs except for SO 4 while SO8 is significantly lower compared to all SOs.

Table 17. *Paired Differences on the Barriers Encountered to Join Community Activities*

		t-value	Sig. (2-tailed)
Pair 1	Personal - Academic	2.972	.004
Pair 2	Personal - Social	-4.643	.000
Pair 3	Academic - Social	-7.526	.000

*Significant at p-value<0.05

Table 17 presents the paired differences on the barriers encountered to join community activities. There are significant pair differences on the barriers encountered by the engineering students in joining community extension activities as denoted by the computed p-values which are less than 0.05 alpha level. Result showed that Academic aspect has significantly higher influence as barrier encountered in joining community extension activities compared to personal aspect which is significantly higher than social aspect. Overall, academic aspect is a major reason for students why most of them could not be able to join the community extension activities while social aspect considered the least. Considering the rigor of the engineering curriculum, most students tend to concentrate on their course requirements rather than attending other school activities like extension projects. Since, participation on this kind of activity is considered voluntary, they will spend their free time to accomplish assignments on professional courses.

5 CONCLUSIONS

The engineering programs in the university under study are still dominated by males and the respondents are mostly involved in the institutional community outreach programs. Engineering students are willing to participate in the

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community extension when they have free time; when they will be joining with friends or classmates and because they will be given extra points in their grades or academic performance. Academic aspect is considered the primary barrier encountered by the engineering students in joining the community extension projects. Results also revealed that due to heavy work load, complexity and nature of engineering courses, students tend to prioritize in completing all their course requirements and assignments rather than joining the extension activities because they believe that this kind of undertaking is not directly related to their field of study. They consider this not as responsibility but rather an additional assignment which is their last priority. They will not be sanctioned for not joining the activity and there is no obligation on their part as the way they see it. Limited support from the teachers is another reason they shared. They were not highly encouraged though they were informed about the community activities but they do not get the motivation they need in order to really pursue their full participation in the projects. This result can be attributed to the findings of the study conducted by Medina (2019) from an experience in State University setting that faculty members as extensionists experience low motivation because they feel unvalued due to lower points in faculty evaluation. Although, working with the community is very noble and remarkable but the rewards and recognition through the achievement of project goals is somehow limited and only given to community extension coordinators. Some students could not be able to express their ideas. They perceived their thoughts will not be given attention, therefore, they tend not to speak or not even try to be heard their opinion. There are two points that this finding can be explained, first is due to lack of self-confidence and second due to fear of rejection. Male engineering students have significantly higher learning experiences in developing their ability to function on multi-disciplinary teams, ability to communicate effectively and having broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. Those engineering students with higher interest of participating in community extension activities have significantly higher learning experiences in SO #4, #7, #8 and #10. However, there is no significant difference on the learning experiences in SO #6 and #9. Academic aspect is a major reason for students why most of them could not be able to join the community extension activities while social aspect considered the least. Institutions of higher learning in the Philippines promote the sense of volunteerism among students to become socially aware of the issues and challenges in the community. It gives them some realizations that everyone should be part of the country's development through sharing their valuable time, efforts and other financial resources to bring positive change in the lives of Filipinos in need.

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