

# **Developing Students Graduate Attributes in Service Learning Project through Online Platform**

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## **Abstract**

This paper describes an e-Service Learning approach to Network Cabling Infrastructure and Wifi project. Engineering undergraduate students enrolled in an ICT Community Service course have been installing network including cabling and wireless networking technology for low cost primary and secondary school. This study demonstrates the basic component of service learning (academic content, community experience and reflection) concurrent with the five phase of service learning. The purpose of this study is to identify students' teamwork competency, students graduate attributes competency and students' perception of e-service learning. Virtual meetings and online reflection activities incorporated before, during and after service learning to ensure students have the potential to articulate students service experience, academic concepts, and reflection in an organize manner. Feedback from students may assist course developer and content developer to better understanding of students' challenges in engaging the e-service learning platform.

## **Keywords**

Service Learning, Generic Skills, Teamwork and Students Graduate Attributes

## **1. Introduction**

The Centre for Co-Curriculum Courses and Service Learning (CCSL) is based in one of the Malaysia Higher Education Institutions. It runs a 2 credit co-curriculum courses and the course offered by CCSL is one of the compulsory courses for students to complete their undergraduate studies. One of the aims of CCSL is to manage and coordinate the co-curriculum courses in a service learning approach. The CCSL administration provide students graduate attributes rubric that students will need to achieve the aims through courses and co-curriculum activities in order to ensure students generic skills are developed. The CCSL aims to produce graduates who have students graduate attributes namely adaptability, communication skills, thinking skills, scholarship, leadership and team working skills. Service learning projects allow students to develop the generic skills that employers highly valued such as communication skills, team working skills, problem solving skills, enterprise skills, planning and organising skills, self-management skills, learning skills and technology skills (Hatcher and Bringle, 1997; Astin *et al.*, 2000; Ropers-huilman *et al.*, 2005; Bringle and Hatcher, 2009). Modern industries require graduate students with enhanced employability skills should provide generic skills as industry needs multi-skilled employees in different engineering disciplines (Markes, 2006). Joseph *et al.*, (2007) stressed that the integration of service learning approach would result in future employees that would have skills and knowledge to perform well in the workplace. Employers today are looking for employees with 21<sup>st</sup> century skills and teamwork is the number one global workforce in the industry (Bates *et al.*, 2004; Casner-Lotto, 2006). Most industry namely management, healthcare, education, science, engineering and technology operate in a form of teams (Scarnati, 2001). Teamwork require a

mix of interpersonal, collaboration, problem solving, and communication skills needed for a group to work together towards a common goal (Pollard *et al.*, 2004). Teamwork is essential since students will always be exposed to a variety of experiences in which they will have to cooperate and collaborate with others.

Here we present the pedagogical rational for developing students graduate attributes competency and including teamwork experience in service learning project.

## 2. Service Learning: Background Review

Despite teamwork is seen as being essential to work collaboratively and the considerable understanding of the advantages of teamwork, employers still indicate that employees continue to report a lack of teamwork competencies (Dench *et al.*, 1998; Casner-Lotto, 2006). Due to teamwork deficiencies, has caused managers in companies demonstrate the inability to manage and collaborate works with other employees (Scarnati, 2001).

A study by Young (2003) on service learning found that team projects in service learning develop managerial skills, collaborative skills and group commitment to teamwork. Service-learning is defined as a “course-based, credit-bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs, and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility” Bringle and Hatcher (1995). By connecting real world experience students provide deeper learning of important concept, theories and ideas (Flores *et al.*, 2012; Yusof *et al.*, 2018). Developing service learning team projects includes attention of five key phases: Investigation (Phase 1), Planning & Preparation (Phase 2), Action (Phase 3), Reflection (Phase 4) and finally Demonstration of Results and Celebration (Phase 5) (Kaye, 2004; Killian, 2004). Service learning a form of experiential combines academic content, community experience and reflection (Kendall, 1990; Saltmarsh, 1997). Figure 1 shows Service Learning overlap with the three basic components of service learning includes academic content, community experience and reflection.

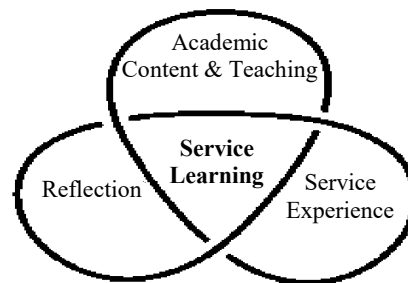


Figure 1. Basic Components of Service Learning (Kendall, 1990; Saltmarsh, 1997).

In academic content, student gain knowledge and applying the knowledge in a real world experience. And in this component involves the first two phase of service learning include investigation, planning and preparation. In community experience, students learn hands on experience from experts in the field, and collaborative partnership between the university and community. Students identified community needs and take action or manage project in an organized manner to serve the community in the community placement.

For reflection component involves the last two phase of service learning which are reflection and demonstration of results and celebration. In these components, students reflect upon the guided critical reflection assignments provided by the instructor that connect theory to practice. Other than serving to the community, students teach what they have learned to the community and adopted the innovations that were introduced. In addition, students recognized their value added achievements with celebration when they exhibit a change in knowledge, attitude and skills.

Reflection is the fourth phase and one of the important components in service learning. Reflections allow students to delve more deeply into the concepts of what should learn. Reflection, a critical component of service learning, is used to “provide the opportunity to reflect and involve students’ beliefs and values” (Oliver *et al.*, 2006). Classroom

discussion and writing portfolio are common forms of reflection in traditional service learning (Hatcher and Bringle, 1997). In classroom discussion may involve students engaging in short and informal discussions whether in small group or large group. In classroom discussion some might feel reluctant or feel uncomfortable to speak because of not able to express vocally; not enough time to think and reflect on course material; and shy or afraid to share thoughts (Biriya and Thomas, 2014). Therefore online discussion forum in online platform gives opportunity for students to interact more with each other (Xia *et al.*, 2013; Biriya and Thomas, 2014). With online discussion forum may make it easier for reluctant students or those who need more response time to participate asynchronously (Yeh & Van, 2005).

Meanwhile in traditional writing portfolio requires students to compile, organize their work and writings in printed or written folders (Wetzel, 2011). This may be time consuming, a waste of paper, money and space. In electronic portfolio (e-portfolio) students can incur more by sharing resources or findings by using different type of media namely text, photo, sound clips, video clips, animation, hyperlink and others (Natalie, 1999). By shifting to electronic portfolio students can easily archive, organize and display their work (Wilhelm *et al.*, 1999) anytime or anywhere as long they have internet connection. E-portfolio is more practical than paper-based portfolios because they provide the opportunity for students-instructor to communicate, review and give feedback asynchronously (Lorenzo and Ittelson, 2005).

Reflection can be supported electronically with online communication tools such as online discussions, e-portfolio, blog and other different mediums of online communication. Having discussed the benefit of using electronic reflection to compare with traditional reflection here we present the implementation of students' online discussion in service learning project through online platform.

## **2.1 Reflection in Online Instruction e-Service Learning**

Parallel to the Z-generation who is more receptive to technology it is important to use technology to support the reflection. One of the forms of reflection in online learning platform is online discussion forums. Online discussion forums are a form of web-based asynchronous communication which allows the students to electronically post messages in a common line area for participants to read and respond (Huang, 2000). Online discussion forums have become a central element within every online learning platform allowing for the extension of teaching beyond the traditional face-to-face classroom (Levine, 2007). Through online discussion forums, students have the opportunity to interact, construct hypotheses, view knowledge and information from multiple perspectives, and reflect upon this information (Nicaise and Barnes, 1996). Guthrie and McCracken (2010) suggest that it is through the reflection accommodated through online discussion forums that a constructivist approach is facilitated leading to the successful service learning within the individual. As a result, online discussion forums represent a unique opportunity for teaching in a new way capable of stimulating an individualized form of service learning (Guthrie and McCracken, 2014).

## **2.2 Reflection in Onsite Instruction e-Service Learning**

Social Networking Services (SNS) another mode of online discussion. SNS have been widely-adopted by students and became a valuable resource to support their educational communications and collaborations with team project (Najafi and Tridane, 2015). Among these application is WhatsApp, it is a cross-platform messenger working under smartphones that can provide personal messaging and share information within the group (Seufert *et al.*, 2016). WhatsApp messenger has been used worldwide and become popular because it is practical for mobile users (Lifewire, 2019). SNS also been used as a group based discussion among employees. Virtual meeting can create virtual community in gathering people in online space where individual can interact with each other. Brown *et al.*, (2017) study, found that SNS can be used for virtual meetings to create virtual spaces where the virtual community can discuss anywhere and anytime. Through the use of SNS, students are able to hold virtual meetings with team members or community partner from different locations. Therefore SNS provide a practical information and practice found in successful of service learning through online teamwork for 21<sup>st</sup> century skills.

In service learning the communications and collaborations are important to community partners. There are many applications that can be used to share information and communicate between students themselves, as well as between the students and the community partner and instructors. In this research our first objective was to identify students' teamwork competency when online discussion forums and virtual meetings implemented in service

learning. The second objective was to explore students' perception of e-service learning that effect students' teamwork.

### **3. Pedagogical Context**

A combination of service learning and online learning are proven to enhance student civic engagement as it can foster student reflection. A case study done by Waldner *et al.*, (2012) in the comparison of traditional service learning and blended service learning; service learners been aided by online learning shows significant performance to compare with traditional service learning.

The forms of online learning whether partially or fully online have been offered by most universities and have been actively produced since the rise of open online course (O'Donnell *et al.*, 2015; Phan *et al.*, 2016; Yusof *et al.*, 2017). The lack of interaction and discussion between students has cause low completion rate continue to impede in online platform (Alraimi *et al.*, 2014; Hew and Cheung, 2014). Therefore educators have been applying the modality of flipped classroom, hybrid and blended learning in online platform on smaller groups to engage students learning (Embi, 2014). The successful of the modality have enlightened educators to innovate the pedagogical approach in enhancing the learning by immersing student in experiential learning. Service learning a form of experiential learning requires a hands-on approach that fully immerses students in the learning process. As describe by Lewis and Williams (1994):

“Experiential learning means learning from experience or learning by doing. Experiential education first immerses learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking.”

Therefore, educators have used e-service learning a form of experiential education and combine with online learning so that students would have an experiential learning experience through online platform (Killian, 2004; Waldner *et al.*, 2012; Soria and Weiner, 2013; Guthrie and McCracken, 2014). The service learning a part of Ministry of Higher Education strategic plan stated in the first shift (KPM, 2015):

“Increasing the use of experiential and service learning to develop 21st century skills, and leveraging technology-enabled models to enable more personalised learning”.

The aim is to ensure online learning complements the service learning. Thus educators should benefit both online learning and service learning to produce students who have enhanced sense of personal values and civic responsibility. In this way, the service learning gap between the generic skills requirement and e-learning system can be minimized.

In e-service learning methodology emphasizes a student centered approach where the students graduate attributes competency are enhanced by service learning and students reflection are supported with an e-learning system. By taking the best of online service learning instruction and the best of onsite service learning create a Hybrid III e-Service Learning (blended) approach (Waldner *et al.*, 2012; Strait & Nurdyke, 2015; Yusof *et al.*, 2018). It enables students to prepare more effectively for classroom activities and subsequently, to reflect on and learn from these activities. It engages students in collaborative learning by improving peer-to-peer discussion and community partner communication. In addition to enhance onsite instruction, e-service learning will be important in increasing flexibility for students, extending learning opportunities outside the classroom and potentially permitting more flexible learning of reflection.

Killian (2004) integrates a combination of the three pedagogical approaches, traditional classroom learning, online learning and service learning in the classroom. It was found that student participate in online service learning perform better than the past student traditional face-to-face classroom. It was concluded students who participated in real-world experience and community service reported higher learning outcome attainment in civic responsibility. Similar study conducted by Soria and Weiner (2013) used service learning to enhance the technical writing classroom experience for undergraduates through online learning. The student feedback from this mixed-method experimental study was overwhelming positive, as there was a positive relationship between participation in service learning and technical writing learning outcomes. Here we wanted to build on the success of these studies and

expose some of the benefits of the e-service learning methodology to our students who are the Z-generation and are more receptive to technology.

However, with the rise in popularity and use of such powerful pedagogical instrument comes the challenge of its effective use to provide a substitute for interactive dimensions found within the service learning approach.

#### 4. The Study Objectives and Methodology

The aim of the current study was to determine the effectiveness of both online platform include online discussion forums and Whatsapp as a virtual meeting among engineering undergraduate students in terms of student teamwork competency and to explore students' experience of e-service learning that effect students teamwork. The course was taught as a Hybrid III e-Service Learning (blended) in which the portion of the service learning activities have been moved online as to enhance the course with inclusion of online discussion forum and virtual team meeting. The goal of Hybrid III e-Service Learning (blended) is to join the best features of onsite instruction and online instruction service learning to promote active independent learning and reduce class meeting time (Waldner *et al.*, 2012; Strait & Nordyke, 2015). The course was designed to ensure a total of 80 hours through face-to-face instruction in the classroom, online instruction through the discussion forum and virtual meeting. In ICT for Community Service course, students learn and apply the knowledge of the basic structure of computer networks with cabling, network hardwares, network design topologies and protocols to a community service effort. As part of the project the entire class works in team to install network including cabling and wireless networking technology for low cost primary and secondary school in Johor Bahru, Malaysia town. This approach integrates experiential learning through assigned community projects.

The service learning project through online platform is shown in Table 1. The online learning module was administered in OpenLearning platform to students enrolled in the ICT for Community during the semester 1 2017/2018 and the course last for 12 weeks. The class met for 2 hours of face-to-face meeting, online learning, hands-on practice and lab each week.

Table 1. Service Learning Project through Online Platform

Week / Phase	Description
<b><i>Before Service Learning Project</i></b>	
Face-to-face and Online Instruction <b>Week 1 – 4</b> Phase 1: Investigation	<ul style="list-style-type: none"> <li>- Introduce syllabus</li> <li>- Introduce navigation system</li> <li>- Introduce course goals, skills and abilities</li> <li>- Introduce to expert in the field</li> <li>- Student reflection on expectation of joining the course</li> <li>- Form committee member</li> <li>- Form virtual meetings</li> <li>- Identify student committee member leader</li> <li>- Site visit to community partner to identify community needs</li> </ul>
Face-to-face and Online Instruction <b>Week 5 - 6</b> Phase 2: Planning & Preparation	<ul style="list-style-type: none"> <li>- Hands-on practice and knowledge on network cabling infrastructure skills</li> <li>- Individual and group assignments posted in OpenLearning</li> <li>- Class discussion in OpenLearning</li> <li>- Successfully completed assignments posted in OpenLearning for peer review and comments</li> <li>- Virtual meetings discussion</li> <li>- Student collaborate and write proposal</li> <li>- Conduct project planning, coordinate tasks with team members, coordinate schedules and estimate price materials with vendors</li> </ul>

<b><i>During Service Learning Project</i></b>	
Onsite Instruction and Service Learning <b>Week 7 – 8</b> Phase 3: Action	<ul style="list-style-type: none"> <li>- Student discuss in virtual meetings</li> <li>- Perform physical labour,</li> <li>- Prepare a detailed proposal and track project progress.</li> </ul>
<b><i>After Service Learning Project</i></b>	
Face-to-face and Online Instruction <b>Week 9-10</b> Phase 4: Reflection	<ul style="list-style-type: none"> <li>- Group discussion of individual work</li> <li>- Student collaborate and draft final report</li> <li>- Course and student peer evaluations</li> <li>- Prepare for final report writing and oral presentation</li> </ul>
Online Instruction and Service Learning <b>Week 11 – 12</b> Phase 5: Demonstration of Results and Celebration	<ul style="list-style-type: none"> <li>- Presentation of final innovations that were introduced to community partner</li> <li>- Celebrate success</li> </ul>

Here we describe virtual meetings and online reflection activities incorporated before, during and after service learning with the five phase of service learning (Investigation, Planning & Preparation, Action, Reflection and Demonstration of Results and Celebration). The incorporation is to ensure students have the potential to articulate students service experience, academic concepts, and reflection in an organize manner.

#### **4.1 Before Service Learning Project**

At the beginning week of the class, an introduction session as to familiarize the students with the OpenLearning platform, its navigation system as well as the service learning activity that will be conducted both online and onsite were introduced. The students were also taught technical skills needed in online platform such as leaving comments in the discussion forum. The instructor also explains course goals, skills and abilities that students will achieve throughout the semester. During this week also students were required to reflect the expectation of joining the course in the online platform.

Students were to form committee members and select roles as to ensure the service learning project runs smoothly. Students were also to nominate group leader. All committee members received a copy of written role description providing clear information about the roles and responsibilities. During the first week also, the instructor distribute the Teamwork Scale for Youth survey instrument (Lower, L. et al, 2015) as to measure students' perceptions of their teamwork competency.

The instructor will teach as usual in the classroom for the second week onwards. Every tool was taught in relation to the project, and as each tool is introduced, students gather in their assigned project teams to apply that tool to cabling and network. Expert in the field were introduced and hands-on practice was carried out from week 2 until week 3 as to prepare them for site visit. During week 4 students apply the first phase of service learning (Investigation), students visit the project site to investigate in gathering information, establish needs, and develop a relationship with the community partner. The investigation is usually supported with acquisition information through photograph, interview, survey and others.

From week 5 until week 6, students were to apply the second phase of service learning (Plan and Preparation). And among the preparation was to equip themselves with hands-on practice and knowledge in cabling and network. To support the skills and knowledge students were required to submit individual and group assignments in OpenLearning. Students were also to discuss in online platform initiated by instructor through online discussion forums. In online forums students have discussions with each other on course-related topics. Students contribute to the discussion by posting messages for peer review and comments to an online message board. Based on the contribution of peer review, students were to collaborate with each other and write proposal. Among the important aspects in writing proposal was to estimate price materials with vendors. The online discussion forum exercise was

to support collaborative peer review of writing proposal. During the plan and preparation, students were actively involved in virtual meetings via Whatsapp. In making plan and preparation students conduct project planning, coordinate tasks with team members, and coordinate schedules.

#### **4.2 During Service Learning Project**

During the service learning project conducted from week 7 until week 8 students apply the third phase of service learning (Action), students execute the installation of Network Cabling Infrastructure and Wifi project. The overall coordination team schedules the timing of team activities and track project progress at the project site. The experts in field are experienced computer network technician, and have been persuaded to visit the project site to monitor students work progress.

Students rely heavily on Whatsapp to communicate with team members. The Whatsapp was intended to create a virtual meeting in which all class members could see and participate in an onsite discussions, ask and answer questions, and encourage students and instructor to focus, stay on task, and clarify issues even though not physically in the meeting room. Students create Whatsapp group as a platform to promote collaboration within teams assigned to address and develop specific portions of the service learning project produced in each course. Instructor guidance was available in online platform and virtual meetings upon request, and in face-to-face meetings. During this action phase of service learning, students prepare a more detailed proposal to estimate the cost needed to make sure the project expenses do not go over budget. The projects expenses were outlined from the cabling network infrastructure sketches made during the site visit and final consideration from instructor and expert in field. Students create Gantt chart with milestone to track project progress. The overall coordination team schedules the timing of team activities to perform physical labor for 16 hours (2 days at 8 hours per day). Students also transmit their knowledge to the community by conducting one day workshop on cabling and networking to ensure community can independently sustain the practices that were introduced through the service learning project.

#### **4.3 After Service Learning Project**

Students were to apply the fourth phase of service learning (Reflection) in week 9, students work individually and in groups to draft their final report. Students contribute to the discussion by working together collaboratively in the online platform and discuss by posting messages for peer review. The following week students were required to give an oral presentation on the completion of the final report. The instructor evaluates the final report based on the criteria provided. And as part of this assessment process, each student documented their experienced and reflection in e-portfolio before, during and after service learning project.

In week 11 students apply the last phase of service learning (Demonstration of Results and Celebration), to wrap up the project students were to present the final innovation that was introduced to community partner. Students celebrate their success when their hard work and dedication being recognized. By recognizing their effort, students received a certificate of appreciation from the community partner and in return students send thank you certificate for being a collaborative partner. Certificate of participation was also distributed to participating community. The honoring and recognition helps to cement the experience in participants' lives.

In week 12, the instructor distributes the Teamwork Scale for Youth survey instrument for post-test and students were asked to complete a simple online feedback. The instructor also recognized students value added achievements with celebration when their employability skills enhanced. The employability skills were assessed using CCSL students graduate attributes scoring rubrics.

### **5. Result and Analysis**

This research utilized both quantitative and qualitative measures to establish an in-depth analysis of e-service learning influence on students' teamwork competency and satisfaction in teamwork.

## 5.1 Quantitative Measure

The first objective was to identify the teamwork competency after online discussion forums and virtual meetings in students teamwork implemented. A descriptive analysis was performed on data collected using pre- and post-Teamwork surveys in order to measure the skills they gained after engaging in the e-service learning while working together with their team member. The students are from various faculties and schools with a different level of academic background. Therefore some students enter the course with little knowledge of computer networks with cabling and others may have relatively strong expertise. The researcher utilized The Teamwork Scale for Youth survey instrument (Lower, L. et al, 2015) comprise of eight questions that measure students perceptions of their teamwork competency. The students answered the five point Likert scale questions ranging from 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree) and 5 (Strongly Agree). The researcher distributes the survey questionnaire in the classroom. The data were collected from 30 students (18 male and 12 female). The percentage score for pre- and post-test score were compared for each item. The results of the pre-test and post-test scores are listed in Table 2.

Table 2. Percentage Scores for subscales pre-test and post-test

Item	Item Statement	Pre-test / Post-test N=30	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Q1	I feel confident in my ability to work in a team.	Pre-test	0	17%	53%	27%	3%
		Post-test	0	0	0	77%	23%
Q2	I know how to team my team members feedback that will not hurt their feelings.	Pre-test	0	0	83%	10%	7%
		Post-test	0	0	10%	57%	33%
Q3	I ask others for feedback.	Pre-test	0	0	83%	14%	3%
		Post-test	0	0	20%	40%	40%
Q4	I make an effort to include other members of my team.	Pre-test	0	0	77%	20%	3%
		Post-test	0	0	8%	45%	47%
Q5	I value the contributions of my team members.	Pre-test	0	0	77%	17%	6%
		Post-test	0	0	21%	42%	37%
Q6	I treat my team members as equal members of the team.	Pre-test	0	0	84%	13%	3%
		Post-test	0	0	12%	45%	43%
Q7	I am good at communicating with my team members.	Pre-test	0	0	84%	10%	6%
		Post-test	0	0	20%	27%	53%
Q8	I feel confident in my ability to be a leader.	Pre-test	0	0	73%	21%	6%
		Post-test	0	0	30%	40%	30%

For item question number 1 shows the highest difference from pre-test and post-test. The result shows 100% agree have increased their teamwork competency in their ability to work in a team. Figure 2 shows the average distribution survey instrument of item number 1. The results indicate individual participant of online discussion forum and virtual meetings after e-service learning instruction have an increase of students' teamwork competency.

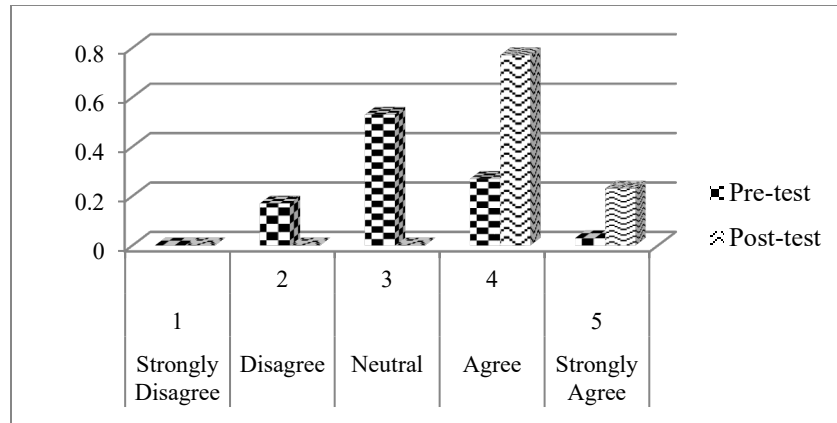


Figure 2. Average distribution survey instrument of item number 1

The students graduate attribute competency shown in Table 3 was based on CCSL students graduate attribute scoring rubrics. The instructor assessed five scoring rubrics including SC1, TW1, TW2, GC4 and AD2. From the results shows 8 students achieve A+, 12 students achieve A, 4 students achieve A-, 3 students achieve B+, 2 students achieve B, and 1 students achieve B-.

Table 3. Students Graduate Attribute competency

Grade	Total n = 30	Scholarship 1 (SC1): Ability to seek and manage relevant information from a variety of sources.
A+	8	Teamwork 1 (TW1): Ability to establish rapport, interact and work effectively with others to accomplish common objectives.
A	12	Teamwork 2 (TW2): Ability to lead and influence team members to complete given tasks.
A-	4	Global Citizen 4 (GC4): Ability to act professionally and responsibly in carrying out duties.
B+	3	Adaptability 2 (AD2): Ability to recognize potential for improvement.
B	2	
B-	1	
Mean = 76		

The average score of 76 indicate there are a need for improvement in the design of course assessments and instructional strategies in e-service learning platform. By giving students exposure for student work experience and implementing e-service learning systematically may help students prepare for further academic and non-academic work.

## 5.2 Qualitative Measure

The second objective was to identify the elements of e-service learning that effect students' teamwork. To answer research question number 2, the investigator asked students to comment on various aspects of the e-service learning platform and the teamwork experiences. After the final phase of service learning, students were asked to complete a simple online feedback to the following questions:

1. What aspect(s) did you like most about the service learning project through the online platform?
2. What aspect(s) did you not like about this service learning project through the online platform?

The first questions derived from students' written comments have been overwhelming. Here are six examples derived from student 3, student 5, student 1, student 7, student 20 and student 18 (S03, S05, S01, S07, S20 and S18):

1. "In my opinion, it is really beneficial to us and important for us to implement this kind of service learning project as it increases our knowledge and skills on self-development." (S03)

2. "It gives me a new experience about community services that I never had before." (S05)
3. "I think it is very useful and interesting as we get to help the community but also learn new things for ourselves. We have developed soft skills and technical skills throughout the community service learning program. It is always nice to experience new things." (S01)
4. "I think it is good because student can learn by action. The student can apply what been learned in terms of computer network knowledge and soft skills for future job." (S07)
5. "In my opinion, service learning for this community service is interesting to know the world of Information Communication Technology and the best part is we work together as a team to run this project as a community member." (S20)
6. "In my opinion, service learning implementation can give more benefit for student because it can give more knowledge, skill and student get experience how to be a volunteer to another place outside classroom to share their skill and knowledge." (S18)

The second question derived from student's written comments was developed into a number of emerging themes. After coding the data, we used Excel to begin categorizing those themes which enabled us to begin to see the patterns. Three themes emerged from this study indicating the following element as affecting student teamwork in e-service learning engagement: online collaborative skills, desire to cooperate and recognition. Here we present 6 written comments examples derived from student 17, student 23, student 19, student 13, student 4 and student 9 (S17, S23, S19, S13, S04 and S09):

(a) Online Collaborative Skills

Common responses included:

1. "We had one group member who rarely discusses through virtual meetings and forum discussion. When we tried to assign one of our group member with delegate task it was halfway done. So someone else had to complete them making it hard and late for us to complete the task." (S17)
2. "It was difficult to get cooperation from others as to complete the task requires teamwork." (S23)

(b) Desire to Cooperate

Common responses included:

1. "Every time when I asked for the cooperation of my team mates, he/she would say was busy with their other subject." (S19)
2. "When team mates did not response in the group discussion in whatsapp or forum discussion I would have to private message them to get response." (S13)

(c) Recognition

Common responses included:

1. "When there was teamwork concerning in the project service learning. It's not fair that I had to do most of the job while others sit around. Sometimes I feel the overload work I did was not seen by the instructors." (S04)
2. "I feel disappointed some of my team mates did not co-operate with me and did not get penalized for it." (S09)

The results of the current study indicate that:

- a) using statistical pre-test and post-test, it appears that students teamwork competency increased after the

- service learning projects was implemented;
- b) the average score of students graduate attribute competency has led to a need to create a meaningful e-service learning environment where student work is valued and appreciated;
  - c) the open-ended questions administered to analyze students satisfaction of e-service learning shows they understand and appreciate the connection between hands-on/application of service learning project outside classroom to achieve the knowledge and self-development;
  - d) the emerging themes derived from the open ended questions to assist course developer and content developer to better understand of students' challenges in engaging the e-service learning platform. The main elements that make activities engaging in e-service learning are online collaborative skills, desire to co-operate and recognition. This emerging theme derived by this study raise an interesting point to endorse the practice of motivation on the students graduate attribute development to enhance the chances of graduates need to succeed in the workforce.

## **6. Conclusion**

The Hybrid III e-Service Learning (blended) approach has shown that it is realistic to complete a Network Cabling Infrastructure and Wifi project - 'from concept to innovation of product', that both excites the students and enhances the online learning covered in service learning, within 12 weeks. E-service learning in the inclusion of online discussion forums and virtual meetings are an effective method of service learning when executed successfully can provide students with a valuable and enjoyable learning experience that develops students graduate attributes competency. Through this study and previous research it has been demonstrated that the incorporation of e-service learning have the potential to have a positive effect on the level of student learning engagement affecting both the students' understanding and knowledge through teamwork.

The students particularly liked the community service aspects of this learning process. Since a number of the students from this study wrote positive comments about the community service and their experiences, the investigators believe that this may have implied that the manner in which students civic engagement were a success. The use of the basic component of service learning (academic content, community experience and reflection) and the five phase of service learning throughout the week was particularly successful in guiding and providing feedback so that the students applied the knowledge and hands-on practice gained from the e-service learning. The e-service learning in aspects of the students graduate attribute competency were particularly successful, despite the challenges occur in online collaboration and team member co-operation, based on their applied knowledge and skills students were able to document the proposal and final report.

A study of extrinsic and intrinsic motivation used to form the teams could lead to interesting findings. Individuals who are motivated intrinsically towards accomplishment are accustomed to deriving teamwork competency and satisfaction from these forms of e-service learning. Although intrinsic motives can be more effective compare with extrinsic rewards; both extrinsic and intrinsic motives play an important role in determining teamwork competency and satisfaction to the learner. This is to develop learners both have self-motivated and self-directed since the activity itself is interesting and aiming for the service learning outcome is important.

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